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UNIVERSITY OF ALBERTA

ENVIRONMENTAL ATTITUDES AND RECREATION BEHAVIOUR OF RESIDENTS IN EDMONTON, ALBERTA

by

LARRY MARTIN RETZLAFF ©

A THESIS SUBMITTED TO THE FACULTY OF GRADUATE STUDIES AND RESEARCH IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF ARTS

DEPARTMENT OF GEOGRAPHY

EDMONTON, ALBERTA

FALL, 1995

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The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research for acceptance, a thesis entitled ENVIRONMENTAL ATTITUDES AND RECREATION BEHAVIOUR OF RESIDENTS IN EDMONTON, ALBERTA submitted by LARRY MARTIN RETZLAFF in partial fulfillment of the requirements for the degree of MASTER OF ARTS.

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Date: Sept. 29, 1995

Abstract

Previous research investigating the relationship between environmental attitudes and recreation participation has had varying results. Early studies found weak support for an association between different types of recreation and environmental attitudes. Recent improvements in measuring this relationship, however, have revealed a positive relationship between appreciative recreation participation and pro-environmental attitudes and also between mechanized recreation participation and anti-environmental attitudes. This study attempts to investigate these associations with a different sample group in a different geographic location and also to investigate the relationship between socio-economic variables and both recreation behaviour and environmental attitudes.

In June and July 1992, 500 questionnaire packages were distributed to adult residents of Edmonton. The recipients of the questionnaire consisted of 250 randomly sampled residents and 250 residents of three upper-income neighbourhoods in southeast Edmonton. Environmental attitudes were measured using a modified version of an environmental attitudes scale developed by Jackson (1986).

The results of this study were not conclusive. Only one socio-economic variable was found to be associated with environmental attitudes, namely gender. A difference was found between the environmental attitudes of active versus non-active recreationists, but no evidence was found to support a difference in environmental attitudes between appreciative and mechanized recreationists. It is possible that the small sample size was a contributing factor to this result.

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CHAPTER 1

INTRODUCTION

Environmental Attitudes and Behaviour

Understanding the relationship between environmental attitudes and behaviour has increased in importance in the last decade. With a perceived increase in the rate of environmental decline on what appears to be a global and irreversible scale, marked by such phenomena as global warming, massive deforestation and declining fish stocks, understanding how we interact with the environment has become an important focus in many fields, including geography.

Early studies in environmentalism introduced the possibility of a relationship between attitudes and behaviour but questioned the extent to which such a relationship truly existed (Carson, 1962; Lappe, 1971; Wicker, 1971; Knopp and Tyger, 1973). More recent research supports the existence of a measurable and important relationship between environmental attitudes and behaviour (Dunlap & Van Liere, 1978; 1984; Jackson, 1986, 1987; Bikales & Manning, 1992). Over time, increasingly sophisticated measurements of environmental attitudes and an improved theoretical framework have supported this relationship. Within the general context of the research conducted on environmental attitudes and behaviour, researchers have used recreation behaviour to study this relationship since, according to Jackson (1986) "many forms of recreation place heavy demands on the natural environment and resources."

Environmental Attitudes and Recreation Behaviour

The prominence that most people place on their pursuit of recreation makes the study of the relationship between environmental attitudes and recreation behaviour important. The pursuit of recreation in modern society can consume a great amount of resources; first, with the manufacture of increasingly diverse and elaborate recreation equipment, and, second, with the maintenance and operation of this recreation equipment. Even an activity generally regarded as being "pro-environmental", such as cross-country skiing, may have a large-scale environmental impact. While an activity itself may have a low direct environmental impact, it is also possible for it to have a profound indirect environmental impact, depending on where and in what context the activity takes place. For example, if a cross-country skier drives a long distance to ski, stays in a hotel and eats in restaurants while away, these associated actions have environmental impacts that are not directly related to the activity itself but are related to its pursuit.

Previous research in examining the relationship between environmental attitudes and behaviour has focused on two main issues: 1) the appropriate measurement of environmental attitudes (Kuhn & Jackson, 1989; Geller & Lasley, 1985); and 2) the nature of the relationship between environmental attitudes and behaviour (Farbrother, 1985; Kuhn, 1988a; Dunlap & Heffernan, 1975; Jackson, 1986, 1987; Knopp & Tyger, 1973; Van Liere & Noe, 1981). Recent research concerning this relationship seems to have focused on particular aspects of this relationship with the use, for example, of different sample groups and improved methodology to validate the overall relationship of

environmental attitudes and behaviour. For example, Coburn (1994) examined the difference in environmental attitudes based on rural-urban difference in residence and Culen, Hungerford, Tomera, Sivek, Harrington and Squillo (1986) examined perceptions and behaviours of five different groups for comparison.

Rationale for the Study

One of the reasons for studying attitudes, in general, is for the theoretical understanding of the connection between attitudes and behaviour as well as for the prediction of actions and behaviours based on attitude. Understanding the theoretical connection has value simply for the sake of knowledge and each contribution to this area of knowledge increases understanding of the theoretical basis of the relationship, in this case, between environmental attitudes and recreational behaviour.

While one of the goals of such research is the greater understanding of this relationship, research into the relationship between recreational activities and environmental attitudes should have a practical goal, as well. If one can understand the attitudes that are related to a particular behaviour, then it is possible that by changing attitudes one can affect behaviour. With specific reference to environmental attitudes and behaviour it may be possible to reduce the impact of our actions on the environment if it is possible to understand this relationship and use this knowledge for that end.

Implications for the present study

This study attempts to explore the relationship between environmental attitudes and recreation behaviour by building on past research, and will examine this relationship in a different context; specifically by examining these two components along with certain socio-economic attributes of a sample group from Edmonton. The general objectives are to:

1. To examine recreational behaviour of Edmonton residents to describe the characteristics of this group with respect to recreational activity.
2. To examine environmental attitudes of sample groups in Edmonton.
3. To examine the relationship between environmental attitudes and recreation participation of sample groups in Edmonton.
4. To examine socio-economic characteristics of sample groups in Edmonton to measure to what extent they may be related to environmental attitudes.

Hypotheses

The hypotheses which will be tested that result from these objective are:

1. Socioeconomic variables are related to environmental attitudes; specifically, women are more pro-environmental than men, younger people more pro-environmental than older people, and higher income individuals more pro-environmental than lower income people.
2. Active recreationists have stronger pro-environmental attitudes than non-active outdoor recreationists.

3. Appreciative recreationists have stronger pro-environmental attitudes than those who participate in either mechanized or consumptive forms of outdoor recreation.

Organization of the thesis

Chapter 1 has served as a general introduction to both the topic being examined and the focus of this particular study. Chapter 2 reviews previous research conducted into the relationship between attitudes and behaviour and focuses on the relationship between environmental attitudes and recreational behaviour. This review will establish trends in environmental attitudes research and places this study in context. Chapter 3 outlines how the research for this study was conducted. It will describe the process of survey administration, sample methodology and initial data analysis. Chapter 4 will present the data that were collected and will provide a description of frequencies for each variable and a description of the manner in which the raw data were aggregated for the purpose of subsequent bivariate analysis. Chapter 5 will use the aggregations developed in Chapter 4 to examine bivariate relationships between aggregated variables. Chapter 6 will discuss the implications of the findings as well as the possible implications of this study for future research directions.

CHAPTER 2

STUDY BACKGROUND

Although there has been some recognition in North American society that the environment and the effects of environmental degradation have been a concern for many years, it has only been in second half of the twentieth century that the environmental movement seems to have reached a wider audience.

There have been many examples, both in Canada and elsewhere, of how awareness of environmental concern has increased. For example, Coburn (1994) noted that the number of environmental interest groups listed by the Alberta Environmental Network increased from 166 to 438 between 1987 and 1992.

Paradoxically, it could also argued that despite more awareness of environmental concerns, the process of environmental degradation is accelerating. Again, there are many examples, such as the possibility that human action is behind such phenomena as global warming and the depletion of fish stocks in the North Atlantic, and most recently with west coast salmon. There could be many reasons for the increase in awareness not having been translated into curbing environmental decline. It is possible that people cannot live in accordance with their desire to act in an environmentally supportive manner because of intervening variables, such as the ideals and physical nature of the society in which they live. For example, recent North American urban planning has been based on the assumption of almost universal car ownership and on the concept of detached single family

housing as being the ideal form of development (Kunstler, 1993). Thus, automobile use and the associated infrastructure needed and the additional resources such as fuel and servicing required all have environmental costs. Such development, as only one example of how our society affects our behaviour, has implications for how we live, the amount and type of energy we consume, and limits the extent to which we may be able to reduce our consumption of energy and other resources.

Another explanation could be that people may not really understand what exactly constitutes "environmental behaviour" and that it is a simple lack of information that mitigates against acting in an environmental manner. An example would be someone driving a car to a recycling centre to recycle flyers received in the mail thinking that this effort constitutes being environmental. Although recycling of resources is valuable, to what extent is it "environmental" to accomplish this goal by driving a car which uses fossil fuels and emits fluorocarbons through its air conditioning system? Knopp and Tyger (1973) observed that even 'the staunchest "environmentalist" would probably concede that his activities have a detrimental effect on our resources, either directly, or indirectly' (Knopp & Tyger, 1973).

Whatever the case, there are many unanswered questions regarding environmental attitudes and the behaviours in which we engage that may have an effect on the state of the environment from local to global levels. The extent to which human behaviour affects the environment is certainly debated and "truths" in this forum change quickly. For example, the phenomenon of global warming was not commonly thought of as being a

problem twenty years ago. In the late 1980s, however, it was a prominent concern; we were continually warned of the enormous consequences of continuing to use hydrocarbons indiscriminately. Lately, however, there have been scientists who have argued that our role in global warming is minimal and that the warming that we may be seeing occur may be the result of factors other than our behaviour.

Early works in the second half of the twentieth century, such as Rachel Carson's Silent Spring (Carson, 1962) outlined for the first time to a mass audience the concern that human behaviour was adversely affecting the environment on a large and long-term scale. Her work was considered revolutionary when it was published but her observations are considered standard knowledge today. Her contention was that the widespread and indiscriminate use of pesticides and herbicides was promoting long-term, deleterious effects on the natural environment and that this would ultimately adversely affect humans. Other works that brought environmentalism to wider society, like Diet for a Small Planet (Lappe, 1971) began to establish a link between human behaviour and the state of the environment. Frances Moore Lappe's overriding concern in her work was with how mass meat production and the North American approach to nutrition promote global degradation. She focused, for example, on the effect that the prevailing North American attitude toward meat consumption has on such processes as deforestation and desertification. In many ways, these works established the connection between attitudes and behaviour and were a precursor to the more formal environmental attitude research which was to follow. Thus, it seems as early as the 1960s, with works such as these, it was

first realized that there was a strong, previously unrecognized link between human behaviour and the effect on the global environment.

These works, with others of the time, contributed to a re-evaluation of the relationship between the natural environment and human behaviour. While works such as these are important and introduce the concept that attitudes and behaviour have an effect on the environment, more rigourous, academic-based research can do much to increase our knowledge of how behaviour and environmental behaviour relate. Culen, Hungerford, Tomera, Sivek, Harrington and Squillo (1986) have suggested that an "investigation into individual and group perceptions of environmental issues might add to the overall understanding of overt environmental behaviour since many different perceptions exist concerning environmental issues." (Culen, Hungerford, Tomera, Sivek, Harrington and Squillo, 1986, p. 25)

Environmental Paradigms

With respect to measuring environmental concern from an academic standpoint, the individual and combined contributions of Riley Dunlap and Kent Van Liere to the field of environmental attitudes and behaviour have been important in several ways. Unlike earlier research, Dunlap and Van Liere were instrumental in measuring how people viewed the world and human activity (Dunlap & Van Liere, 1978, 1984). In examining samples of their work since 1976, it is possible to observe the changes that have occurred in the emphasis and the complexity of their work, to identify consistent themes over time and to identify how their work and the paradigms they developed affected the work of

subsequent researchers.

In addition to their general work on environmental attitudes, other researchers have conducted research into different aspects of environmental attitudes in general, and into the relationship between environmental attitudes and recreation behaviour and these will be examined as well.

The New Environmental Paradigm

The contributions of Dunlap and Van Liere, working together, independently and each with other researchers have been many and varied.

- First, they established and refined the concept of a `New Environmental Paradigm' which, they argued, opposes the dominant, but not unanimous, societal view of the environment. This dominant view has been termed the `Dominant Social Paradigm.'
- Secondly, in their preliminary empirical studies, they examined the environmental attitudes of both the general public and a specific sample group in one study to determine the extent of 'environmentalism' which exists and have since applied their findings in subsequent, increasingly sophisticated, articles.
- Thirdly, they developed an adequate means by which to measure the degree to which individuals accept either the NEP or the DSP by examining peoples' attitudes toward the environment and subsequently their adherence to either the DSP or NEP.
- Finally, they have built upon their early empirical work with subsequent work which interprets the data in various ways and increases the value and the sophistication of this early work. This manipulation may increase its explanatory and predictive value.

One of earliest articles by Dunlap and Van Liere with an empirical basis concerning environmental attitudes and the existence of a New Environmental Paradigm was an article published in The Journal of Environmental Education entitled "The 'New Environmental Paradigm': A Proposed Measuring Instrument and Preliminary Results" in 1978. The paper was based on research from 1976 which the authors conducted in Washington state. There were two goals in undertaking this survey. The first was to develop a means by which they could measure the acceptance of an environmental view of the world: what they called the 'New Environmental Paradigm.' The second was to assess the degree of public acceptance of the NEP. They developed a 12-item scale (Table 2.1) which was administered to two sample groups in Washington state: a sample of the general population and a sample of members of a state-wide environmental organization.

In the conclusion of this article, Dunlap and Van Liere stressed the importance of further study on the NEP, specifically in surveying other populations to determine the validity of their observations as well as to determine changes to the adherence to the New Environmental Paradigm. It is important to note that at this point in their work Dunlap and Van Liere accepted that the gap between attitude and incongruent behaviour was accepted by most people "without perceiving the conflict between them." This may indicate that their work at the time, while arguing that an NEP existed, was not involved or interested in determining the gap that exists between environmental attitudes and behaviour, or what they later called "cognitive dissonance." In other words, the most important concern in this work was determining the existence of an NEP and how to accurately measure it,

rather than in attempting to explain the reasons for difference between attitudes and behaviour.

Table 2.1
New Environmental Paradigm Items

	Statement
1.	The balance of nature is very delicate and very easily upset.
2.	When humans interfere with nature, it often produces disastrous consequences.
3.	Humans must live in harmony with nature in order to survive.
4.	Mankind is severely abusing the environment.
5.	Humans have the right to modify the natural environment to suit their needs.
6.	Mankind was created to rule over the rest of nature.
7.	Plants and animals exist primarily to be used by humans.
8.	We are approaching the limit of the number of people the earth can support.
9.	To maintain a healthy economy we will have to develop a steady state economy where industrial growth is controlled.
10.	The earth is like a spaceship with only limited room and resources.
11.	Humans need not adapt to the environment since they can remake it to suit their needs.
12.	There are no limits to growth beyond which our industrialized society cannot expand.

Paradigmatic Conflict

In 1983 Dunlap and Van Liere published "Cognitive Integration of Social and Environmental Beliefs". The article was meant to integrate some of the ideas they developed in previous studies. It addressed the concern they raised previously about the extent to which cognitive dissonance exists between peoples' environmental attitudes and their behaviour. In their discussion they stated, though many factors influence attitudes and behaviour, most attitudes and behaviour are based on a set of beliefs about relevant objects.

In this article, as the others, they recognized the existence of a DSP and an NEP but developed to a further extent the idea that these paradigms represent a more cohesive set of beliefs about the individuals view of the world than they seem to have acknowledged in their earlier work. They also argued that failure to organize these beliefs into a consistent pattern is associated with greater inconsistency between attitudes and behavioral responses. They asserted that "(c)ognitive integration of salient beliefs is an important factor in attitude/behaviour consistency." This article, along with much of their work following 1978, was based on their 1976 Washington state survey.

Dunlap and Van Liere, in a 1984 article "Commitment to the DSP and concern for Environmental Quality," explored the "traditional values and beliefs constituting our society's dominant social paradigm" and argue that these beliefs are important sources of opposition to environmental protection. They pointed out there is a negative relationship between adherence to the DSP and general environmental concern but that this negative

relationship is far from perfect; there are behaviours that may not be able to be explained by a person's adherence to the DSP. They discuss the term 'cognitive dissonance', which is a term usually associated with an individual and apply it to society. In this article, they argued that societal level dissonance is "paradigmatic conflict" and that the environmental movement has reached the point where it challenges the DSP and offers an "ecological worldview." Dunlap and Van Liere pointed out that the DSP has a strong institutional base which will resist a paradigm shift. They also argued that "the success of the DSP and its challengers will depend on the degree to which they 'work' as social paradigms."

In this article, they emphasized the nature of the opposition between the two paradigms. This emphasis may indicate that they may no longer question the existence of an NEP and its strength as a primary issue, but had progressed to the point in their thinking that the real issue is how the NEP will replace the DSP and the issues involved in that process. One important difference which seems to exist between this article and previous ones by Dunlap and Van Liere was their emphasis on the societal importance of the NEP rather than on questions of measurement, for example. It seems that their perspective of their work and its implications had become broader since their earlier research on the topic.

Themes in Dunlap and Van Liere's Research

There are common themes in Dunlap and Van Liere's work which have persisted over time. First, and most importantly, Dunlap and Van Liere argue in each article that environmental attitudes determine a person's relative adherence to either DSP or NEP.

This may be self-evident with respect to the NEP but the DSP is not necessarily a unidimensional measure of environmental attitudes; it may be argued that it encompasses other factors. As well, they contend that the emergence of an NEP has been both recent and surprising and that the rise of the NEP represents a revolutionary occurrence and that research into examining different groups and with the process of paradigm shift takes increasing prominence. It is important to note that early in their work Dunlap and Van Liere accept that the gap between attitude and incongruent behaviour exists without individuals perceiving the conflict between them. Later it seems that they recognize that individuals recognize there are conflicts, but that the individuals can see them and will attempt to reduce the `cognitive dissonance' associated with their conflicting beliefs over time (Dunlap & Van Liere, 1984). Thus, the research they have conducted has increased in complexity and has revealed more detail than at the time the earlier articles on their research were written.

Although Dunlap and Van Liere's work becomes increasingly complex and is able to say more about the nature of the relationship between environmental attitudes and behaviour, they see the NEP and the DSP as two opposing, competitive societal paradigms when at least two other interpretations are possible. First, most people fall between the NEP and the DSP with respect to attitudes and thus do not adhere to either the NEP or the DSP.

Secondly, they do not recognize that the people and organizations which have a strong, vested interest in the DSP may have the ability to co-opt and disarm the power of

the NEP by co-opting the movement. For example, in the most recent Earth Day celebrations in New York City there were a number of corporate sponsors whose products, services, and global environmental actions are by no means congruent with the NEP, yet they presented themselves as such and, except for a few dissenters, were presumably accepted as being organizations which are "environmental". The point is that many people may not have adequate access to information as to what constitutes the NEP and environmental behaviour, and so may be able to be, at least for a short time, led about by groups attempting to pass as environmentally concerned which really are not.

It is interesting that much of the work that Dunlap and Van Liere have published, even as late as 1984, is based on a single empirical study of Washington state residents. The information with which they have had to work has remained the same, while the interpretation of that work has changed and has become more elaborate with time. The information obtained from their 1976 survey has also been applied to questions that Dunlap and Van Liere had possibly never envisioned when they did the study; for example, determining the gender difference associated with environmental attitudes and the possible reasons for this difference (McStay & Dunlap, 1983).

While their work has shown consistency over time in certain respects, such as the recognition of the existence of a competing NEP their work has also changed in certain respects. Over time it appears that their work has become more complex as they have manipulated their data in different ways and, subsequently, so have their interpretations based on that data. The focus has also changed in that their earlier work seems concerned

with the measurement of the NEP, then progresses to examining the nature of the conflict between the NEP and the DSP, and eventually reaches the point where Dunlap and Van Liere begin to discuss the mechanics by which the NEP may supersede the DSP.

Subsequent 'New Environmental Paradigm' Research

Based on the work of Dunlap and Van Liere, other researchers have investigated the nature of the NEP in different ways. Albrecht, Bultena, Hoiberg and Nowak (1982) tested Dunlap and Van Liere's Washington state results by conducting a similar study using two sample populations in Iowa; farm operators and urban residents. They were interested in discovering to what extent the NEP was a reliable, valid and unidimensional measure of environmental concern. They proposed to test the NEP by approaching each of these elements individually. Concerning reliability, they argued that any attitude scale "must be reliable to warrant its continued use" (Albrecht et al., 1982, p. 40). They found that the reliability coefficients which resulted from their study were large enough to confirm the NEP scale as a reliable indicator of environmental concern.

With respect to the validity of the NEP, the authors suggested it can been determined in at least two ways; by what they call 'face validity', meaning the items logically reflect the attitudes being measured; and by predictability, meaning that scores correlate with scores from other instruments that measure those attitudes. Comparing the results of their study to the results of previous ones that measured farm-urban environmental attitudes they found similar patterns with similar magnitudes. Thus, they concluded that the NEP scale was a valid instrument to measure environmental attitudes.

Concerning unidimensionality of the NEP scale, a factor analysis they performed of their data resulted in three dimensions. The authors suggested that the NEP was multidimensional and was actually measuring the orientation of three components of environmental concern: 1) balance of nature; 2) limits to growth; and 3) man over nature.

This study was important in that it reinforced the notion that the NEP could be regarded as multidimensional. Albrecht et al.'s contention was that by regarding the NEP as a unidimensional scale it was possible that valuable data and explanatory usefulness were being lost. They concluded that this was an important consideration since

> ...(t)he importance of analytically distinguishing between the domains is seen in the fact that they may, for some populations, be unrelated. It seems that persons can fully endorse some elements of the New Environmental Paradigm, while at the same time rejecting other elements. (Albrecht et al., 1982, p. 42)

They concluded by noting that recognition of the NEP scale's multidimensionality is an important factor in "the future use and interpretation of the NEP scale" (p. 42).

Geller and Lasley (1985) also explored aspects of the NEP scale. They decided to examine the dimensionality aspect of the scale by conducting a study using the data collected from both Albrecht et al. (1982) and a second survey conducted in Missouri by Lasley and Nolan. The objectives of their study were:

1. to examine the factor structure of the NEP scale using three separate samples from the previous two studies;
2. to assess the minimum number of factors needed to fit the data for the sample they chose;
3. to test for equality of the factor structure if a stable factor structure is found.

4. to interpret the factors within a sociological framework.

They were unable to verify either the view that the NEP was unidimensional or Albrecht et al.'s contention that the scale was a three point multidimensional scale consisting of twelve items. They found support, instead, for a three factor model which used only nine items from Dunlap and Van Liere's original 12 NEP statements.

Kuhn and Jackson (1989) argued that the "measurement of values and attitudes must be standardized if comparisons are to be made possible between and within populations." (Kuhn & Jackson, 1989, p. 27) The data for their study consisted of two surveys administered two years apart. The first survey was a self-administered questionnaire mailed in July of 1984 to 1,600 Edmonton and Calgary residents. This questionnaire contained a 24 item modified environmental attitudes scale developed by Jackson. The second survey was also a self-administered questionnaire mailed in September 1986 to residents in the same two cities and contained a 21 statement environmental attitude scale which was a revision of the earlier scale. These scales combined items from the 'New Environmental Paradigm' and the 'Dominant Social Paradigm' developed by Dunlap and Van Liere in addition to items suggested from environmental attitude literature. The items were categorized into the four dimensions that emerged from the earlier scale developed by Jackson: 1) Negative consequences of growth and technology; 2) Relationship between mankind and nature; 3) Quality of life; and 4) Limits to the biosphere.

They found that the four dimensions they used for analysis displayed "conceptual as well as statistical consistency." They also observed that the 21 point scale had value in "measuring similar dimensions of environmental attitudes among different samples" thus establishing consistency in attitude measurement. They concluded that the

> ...results suggest that our twenty-one-item modification of Dunlap and Van Liere's "new environmental paradigm" and "dominant social paradigm" scales can be used in future research in which attempts are made to replicate the present investigation or to generate data for comparative purposes. (Kuhn & Jackson, 1989, p. 31)

Noe and Snow (1990) conducted a study of national park visitors in the United States using the NEP scale items. The important feature of this study was the diverse range of participants in the study because of the locations of the parks in the study. Rather than examining data from one or two sample groups from one geographical region, their study encompassed respondents from 5 national parks at different locations throughout the United States over an 11 year period. The authors' hypotheses were:

1. that park visitors at different locations in the United States would support an ecological environmental view.
2. that the NEP scale would demonstrate a unidimensional nature.

Instead of the unidimensional nature that they were expecting to find, a multidimensional structure emerged from their data. Unlike Geller and Lasley, however, who found three dimensions, the authors found two dimensions instead.

The authors made several conclusions which they believed had implications on subsequent research. First, they believed that the NEP scale was not necessarily

unidimensional. They argued that the "eventual power in the scale may be concentrated in one, two or even three attitudinal dimensions, with each reflecting an ecological sensitivity to the environment." (Noe and Snow, 1990, p. 26). Second, they suggested that a modified version of the NEP scale be utilized in subsequent research. Third, they suggested, notwithstanding the second conclusion, that the NEP scale should not undergo radical changes from its basic configuration.

Shetzer, Stackman and Moore (1991) utilized the NEP scale to examine the environmental attitudes of business students with particular interest in the extent to which these students believe that business should be concerned with environmental protection. They were also interested in exploring the beliefs that form the basis of what they termed "business-environmental attitudes" (Shetzer et al., 1991, p. 15). There were two general hypotheses in their study:

1. Because business students might be expected to hold relatively materialistic, conservative, and laissez-faire views, they will not be pro-environmental, especially when asked to consider tradeoffs between economic benefits and environmental protection.
2. Business-environment attitudes will be related to environmental worldview, as measured by the NEP scale.

They surveyed 237 undergraduate business students using the NEP scale as part of their questionnaire and found that there were strong pro-environmental views among their sample group. The overall NEP score on their 7 point environmental attitudes scale was

5.13, which suggests "a high overall endorsement of NEP values" (Shetzer et al., 1991, p. 18).

The authors concluded that results of their study "provides further support for the predictive validity of the NEP scale" and supported the contention that the NEP scale consisted of three dimensions (Balance of Nature, Limits to Growth, and Man over Nature) instead of being a unidimensional instrument. Their results also suggested that adherence to the NEP was increasing since their survey sample, which they had assumed not to be pro-environmental, displayed strong support for the NEP.

Gigliotti (1992) conducted a study in 1990 using 11 environmental attitude items selected from the environmental attitude scale developed by Kuhn and Jackson the previous year. Gigliotti conducted a study of 1050 Cornell University students and compared their attitudes with similar studies conducted in 1971 and 1981. He found that students in 1990 were less willing to make personal sacrifices to address environmental issues that those surveyed in 1971. He also found that the NEP items he included in his questionnaire were the best predictors of a respondent's willingness to give up material goods that reflected a high consumption lifestyle. This result reinforced the validity of the NEP scale as an appropriate measure of environmental concern found by other researchers.

Environmental Attitudes and Recreation Behaviour

The emergence of concern over the effect of recreation behaviour on environmental decline is a natural extension from concern about the environment in

general. The possibility of a negative impact on the environment arising from a variety of recreational activities is a factor in this concern.

Hendee (1969) developed a classification for recreation activities based on the level of environmental concern of the participant. He categorized recreation activities as being appreciative, mechanized or abusive. Appreciative activities were those activities which have a low environmental impact compared to the other two recreation activities and involve enjoyment of the natural environment without changing it. Examples he used of such activities were hiking, walking and cross-country skiing. Mechanized recreational activities were those that involve burning of fossil fuels for participation, for example, snowmobiling or motorboating. He regarded abusive recreational activities as those that extract an element of the environment in its participation such as hunting or fishing. His conceptual analysis of recreation activities in this manner persists in and helped define the categories used in subsequent research.

A study by Knopp and Tyger (1973) suggested that recreation participation may be determined by attitudes rather than the reverse. They studied the differences in attitudes between snowmobilers (motorized recreationists) and cross-country skiers (self-propelled recreationists) to test two hypotheses: 1) that those who participate in motorized forms of recreation are less likely to hold environmental values than those who participate in self-propelled forms of outdoor recreation; and 2) that people who participate in motorized forms of recreation are less likely to understand devoting specific recreation areas for specific purposes than those who participate in activities with less environmental impact.

Jackson (1989) has noted that this study "did not tap fundamental beliefs and values in the manner of subsequent studies" but rather the researchers limited themselves to specific items in their method to assess environmental attitudes. Knopp and Tyger observed that "(p)robably few participants in either snowmobiling or ski touring identify with a particular ideology; more likely they are simply trying to enjoy themselves" (Knopp & Tyger, 1973, p. 15) suggesting that the theoretical basis of research at the time was not well developed. They also recognized that with the "limited evidence provided by this study it is impossible to say whether attitudes determine participation or participation determines attitudes" but that the research they conducted suggests the hypothesis that the "relationship between attitudes and preferences revealed by this study can be developed into a more general hypothesis."

Dunlap and Heffernan (1975) suggested that increased participation in outdoor recreation, which "stimulated the emergence of the environmental movement and widespread concern for environmental quality in the late 1960s and early 1970s" (Jackson, 1989). This was a result, they argued, of "an awareness of environmental problems by exposing people to instances of environmental deterioration" (Dunlap & Heffernan, 1975, p.15). The hypotheses they tested were:

1. that there is a positive relationship between participation in outdoor recreational activities and environmental concern.

2. that there is a stronger association between participation in 'appreciative' activities and environmental concern than between 'consumptive' activities and environmental concern.
3. that there is a stronger association between participation in outdoor recreational activities and concern for protecting aspects of the environment necessary for pursuing such activities than between participation in outdoor recreational activities and more "distant" environmental concerns.

Dunlap and Heffernan used a sample of Washington state residents. They suggested that the sample size (3,101 respondents) appeared to provide an accurate representation of the population at the time.

The results of their study indicated mixed results for the hypotheses. The first hypothesis received what they termed "mixed and generally weak support from the data." While the associations were generally found to be in the predicted direction, the magnitude of the difference for most was negligible. The second hypothesis received support from the data and suggested "the necessity of contrasting the effects of appreciative and consumptive activities" in future research. The third hypothesis received what they termed "considerable" support from the data. The support that the authors found for the second and third hypotheses suggested that there is a positive relationship between recreation behaviour and environmental attitudes and environmental protection.

Geisler, Martinson and Wilkening (1977) were the next researchers to examine Dunlap and Heffernan's study by testing the first and second hypotheses using data

collected from 1423 residents of 19 counties in Wisconsin. They tested the hypotheses that:

1. involvement in outdoor recreation is positively associated with environmental concern.
2. the association is stronger between appreciative than between consumptive activities and environmental concern.

They observed that environmental concern is associated more with 'appreciative' recreation styles rather than with 'consumptive' recreation styles. They concluded , however, that their study

> ...leads us to question the generalization that specific types of recreation produce varying degrees of environmental concern or commitment to public policies regarding natural resources. At most it can only be said that particular forms of outdoor recreation are related to particular environmental concerns at particular times and places. (Geisler et al., 1977, p. 248)

They also observed that it was possible that "individual characteristics rather than recreational habits...account for most of the environmental concern in northwest Wisconsin." (Geisler et al., p. 247).

Pinhey and Grimes (1979) also reexamined the hypotheses of Dunlap and Heffernan. They believed that the results found by Dunlap and Heffernan were too inconclusive to support their hypotheses. They tested Dunlap and Heffernan's hypotheses using their own study based on 926 Louisiana residents. Their hypotheses were:

1. that persons who participated in recreational activities are more environmentally concerned than those who were inactive.

2. that persons concerned with environmental quality were also expected to suggest that conservation and 'natural' use are the best ways to utilize the "natural areas" in the state.

For the first hypothesis, the data suggested that the relationship between the variables was "weak to moderate." For the second hypothesis, they found that there was no difference in responses to environmental attitude statements between recreationally active and recreationally inactive respondents.

Thus, their research results led them to disagree with the finding made in Dunlap and Heffernan's earlier study that there was a positive relationship between environmental concern and outdoor recreation. The results of their study, they believed, "did not provide the levels of support for the hypotheses that the Dunlap and Heffernan (1975) study indicated" (p.6). Pinhey and Grimes' results, however, were based on a different sample group from that of Dunlap and Heffernan and did not use the same hypotheses. As well, their methods of determining recreation activity and measures of environmental concern were different. It is understandable, then, that their results may have differed from those of Dunlap and Heffernan.

Van Liere and Noe (1981) also found only weak support for the Dunlap and Heffernan study. They noted that "one explanation for the weak results is that the relationships have been attenuated by poor measures of outdoor recreation and environmental attitudes" (Van Liere & Noe, 1981, p.507). They proceeded to re-examine the hypotheses of Dunlap and Heffernan "using what we believe are stronger measures of

both variables" (p. 507). They used the 'New Environmental Paradigm' scale developed by Dunlap and Van Liere (Dunlap & Van Liere, 1978) to measure environmental attitudes. They found that the first hypothesis presented by Dunlap and Heffernan; that there was a positive relationship between outdoor recreation participation and pro-environmental attitudes, was not supported by their own results. They were also cautious in their support of the second hypothesis, that appreciative recreationists are more pro-environmental than consumptive recreationists. While they found evidence to support this hypothesis, they noted that it was only "somewhat" supportive and that the coefficients supporting this hypothesis "are low in magnitude" (Van Liere & Noe, 1981, p.509). They also noted that "the results suggest that neither the use of the NEP scale nor the changes in measuring outdoor recreation have a significant effect on the associations between outdoor recreation and pro-environmental attitudes" (Van Liere & Noe, 1981, p.510). The authors also suggested, however, that improvements in study design may yield more conclusive results.

Jackson (1986) suggested that "values and attitudes of a society exert a profound influence on recreational choice." He surveyed 1600 residents of Edmonton and Calgary, Alberta using a 24-item environmental attitude scale developed from the NEP and DSP scales in addition to other items suggested from environmental attitudes literature.

He found that the items resulted in 4 dimensions when factor analyzed: 1) limits to the biosphere; 2) relationship between man and nature; 3) negative consequences of growth and technology; and 4) quality of life. His results suggest that recreation

participation is positively related to environmental attitudes among his sample. The reason for this positive relationship may be the improved methodological design when compared to previous studies which Van Liere and Noe suggested were needed to produce more conclusive results.

He commented, however, that "only when participants in a recreational activity deviate strongly from the rest of the public are the differences large enough to be statistically significant" (Jackson, 1986, p. 13).

Jackson (1987) examined outdoor recreation participation and resource development and preservation by using data from the Edmonton and Calgary survey already discussed. Jackson's hypotheses for this study were:

1. Participants in similar activities (classified as appreciative, mechanized, and consumptive) will not differ in their views on the development or preservation of resources.
2. Participants in consumptive and mechanized activities will not differ in their views on the development or preservation of resources.
3. Participants in appreciative activities will exhibit a stronger pro-preservation position and a weaker pro-development position than participants in consumptive and mechanized activities.

Jackson found that participants in appreciative activities were, indeed, more preservationist than those who were participants in either consumptive and mechanized activities except for those who participated in hunting. He also found that the

preservationist view was supported by the majority of the urban Alberta residents in his sample. Jackson's results lend support to the second Dunlap and Heffernan hypothesis.

Bikales and Manning (1990) also explored the relationship between outdoor recreation and environmental concern with a particular interest in measurement and analytic techniques. They introduced techniques for analysis of the relationship which they believed differed from previous studies in important ways, such as asking respondents to provide a relative self-assessment of the frequency of their recreation behaviour instead of the standard survey approach. They tested Dunlap and Heffernan's first two hypotheses by surveying 503 Vermont residents by phone. The response rate for the survey was eighty four percent. The authors used a modified technique for pairing activities developed and used by Jackson in his 1986 study.

Their findings suggested a weak positive relationship between outdoor recreation participation and environmental concern. However, Bikales and Manning found a strong positive relationship between environmental concern and appreciative activities compared to what they called 'depreciative' activities. The authors noted that "support for the Dunlap and Heffernan hypothesis found in this study is generally stronger than that of previous investigations" (Bikales & Manning, 1990, p. 17). Even so, they concede that the results may be a function of a particular time and place, as was suggested by Geisler et al. (1977). The authors also noted that the methodological techniques developed by Jackson (1986), particularly in studying pairs of recreation activities "exhibit a good deal of promise" for future research (Bikales & Manning, 1990, p. 17).

Asfeldt (1992) tested four hypotheses to test the relationship between environmental attitudes and recreation behaviour in his study of the participants in guided wilderness canoe trips. His hypotheses were that:

1. there is a positive association between participation in guided wilderness canoes trips and pro-environmental attitudes.
2. there is a positive association between participation in guided wilderness canoes trips and increase in pro-environmental attitudes.
3. there is a positive association between pro-environmental attitudes and self-reported pro-environmental intentions.
4. there is a positive association between self-reported pro-environmental intentions and self-reported pro-environmental behaviours.

He surveyed participants both before and after a guided wilderness canoe trip to see to what extent, if any, their environmental attitudes changed as a result of the trip.

He found that his data supported the first and third hypotheses, but the third only exhibited what he called "weak" support. The second hypothesis was not supported by the data while the fourth hypothesis of his study was not tested because of a lack of data. However, the support in the data shown for the first hypothesis suggested additional support for the relationship between appreciative types of recreation behaviour and pro-environmental attitudes.

Coburn (1994) conducted a comparison of the environmental attitudes of rural and urban residents and their influence on outdoor recreation participation. She examined

residents in different communities in Alberta to test three hypotheses. Her first hypothesis was that there is a relationship between recreation participation and environmental attitudes. She also hypothesized that there would be differences in the nature of rural and urban outdoor recreation activities and that there would be a difference in environmental attitudes between rural and urban residents in Alberta. Other than finding there was a significant relationship between current residence and recreational participation in the direction she hypothesized, there was no support for the other hypotheses of this study.

Socio-economic Variables and Environmental Attitudes

Geisler et al. (1977) examined outdoor recreation and environmental concern in a study which has already been discussed. One of their conclusions was that the socio-economic variables of age, education and place of residence had more relationship to variation in environmental concern than did outdoor recreation styles. They found that age was the most influential predictor of environmental problem awareness in their study. Older respondents "showed lower levels of concern than did their younger counterparts" (Geisler et al., 1977, p. 246).

In 1980, Van Liere and Dunlap published 'The Social Bases of Environmental Concern: A Review of Hypotheses, Explanations, and Empirical Evidence'. This study reported on the results of other studies concerning environmental attitudes, environmental awareness, environmental behaviour and their relationship to socio-economic variables. They approached their study by first examining the common hypotheses and theoretical explanations presented in previous research and, second, by summarizing the evidence that

may support the relationship between socio-economic variables and environmental concern.

With respect to age, they found that most of the studies they surveyed found there was a negative relationship between age and pro-environmental concern. As well, they noted that the strength of the association between age and environmental concern is stronger compared to other socio-economic variables that they reviewed. One observation they did make in their review of the evidence is that "there is no agreement on the direction of the relationship between sex and environmental concern" (Van Liere and Dunlap, 1980, p. 186). When the authors examined the research that concerned the relationship between income and environmental concern they noted that these studies are "quite ambiguous and fail to support the hypothesized positive association" (Van Liere & Dunlap, 1980, p. 190). They concluded that "researchers have had limited success in explaining the social variables of environmental concern" (Van Liere & Dunlap, 1980, p. 193).

Honnold (1984) explored the relationship between age and environmental attitudes by examining longitudinal data from the American National Opinion Research Center General Social Surveys. She suggested that there is an inverse relationship between age and environmental concern which is a function of two factors. First, she argued that this pattern can be attributed to what she called a 'period effect', meaning that people of similar ages have similar outlooks on certain issues because of a common background and this can be expressed in their environmental attitudes. As well, she suggested that there is

an aging effect which exists that also produces this inverse relationship; that as people age they generally become less environmentally concerned.

McStay and Dunlap published an article in 1983 entitled 'Male-Female Differences in Concern for Environmental Quality' which manipulated the Washington state data of Dunlap and Van Liere from a new perspective by examining differences in gender and environmental concern within both the General Population Sample and the Environmental Organization Sample surveyed by Dunlap and Van Liere. The authors found modest support in both sample groups for the hypothesis that women are more concerned about environmental quality than men. However, they also had mixed findings about differences in behaviour between men and women with respect to environmental attitudes. They concluded that the relationship between sex and concern for environmental quality, and certainly the underlying factors that account for this relationship, clearly warrant more consideration. They noted that research on these issues should not only help in understanding the bases of public support for environmental quality, but also improve the understanding of sex roles in modern society.

Gifford, Hay & Boros (1982) also explored the relationship between gender and environmental concern. They examined individual differences in environmental attitudes in the responses of students using an environmental inventory developed by Maloney, Ward, and Braucht consisting of 30 true-false questions and 15 multiple choice questions rather that the NEP scale of Dunlap and Van Liere. One of their conclusions, which contradicted the conclusions of McStay and Dunlap, was that women have less environmental concern

than men. This study, however, measured not simply attitudes but also measured affect, emotion and both verbal and actual commitment to the environment. They found that women, compared to men, appeared to know less, "while professing to be more emotionally upset and more verbally committed." (McStay & Dunlap, 1983, p. 23).They found that the strongest indicator of environmental concern and commitment was level of environmental education of the respondent.

Farbrother (1985) suggested, based on his review of previous research which has already been mentioned, that income, of all the other socio-economic variables "has proved to be the most reliable variable for explaining variations in energy conversation, perception of energy problems, and the adoption of conservation practices" (p. 18). However, in his own study, he found that environmental attitudes did not vary significantly with age, sex, education, and income.

Neuman (1986) investigated the relationship between personal values and commitment of energy conservation. Neuman's study was conducted in Southern California and comprised 376 respondents. Data were collected on a variety of personal aspects including gender, age, educational level, and income. He examined these variables for their possible influence "on the impact of values on behavior...using hierarchical multiple regression analysis." (p. 64). He found that there was no significant relationship in using these variables to predict behaviour commitment "beyond what might occur by chance alone" (Neuman, p. 64).

Samdahl and Robertson (1989) examined the social determinants of environmental concern. Their study was an attempt to develop a causal relationship between demographics and liberal ideology with environmental concern. They noted that "previous studies have tested age, education, income or residence as precedents to environmental concern."

The data they used were a subsample of an earlier study of residents of the state of Illinois and comprised 2,131 respondents. From the original data, they selected such variables as age, income, and education as demographic variables. This study, however, did not utilize the NEP items developed by Dunlap and Van Liere, but used environmental attitude statements which were specific to their study. They classified the environmental statements from this study into three dimensions of environmental concern: 1) Perceptions of environmental problems; 2) Support for environmental regulations; and 3) Ecological Behaviors.

Income was the only demographic variable in this study found to have an association with all of the three environmental dimensions. The authors found there was an inverse relationship between income and environmental attitudes. Each of the other demographic variables they tested (age, education and residence) against their environmental attitude dimensions had one dimension for which there was no association. They concluded that the was little evidence to suggest there were associations between these variables and environmental attitudes. This study, however, found a negative relationship between level of education and the dimensions concerned with the support of

environmental legislation dimension and the perception of environmental problems. Van Liere and Dunlap (1975) found that most studies up to that point found a positive relationship between these two variables. The authors were not able to explain this difference in their study from previous ones.

Discussion

It is evident that there is still some question in the literature concerning the extent to which environmental attitudes, outdoor recreation and socio-economic variables are related. Even though significant research has been conducted concerning environmental attitudes and the value of the NEP in measuring them, there are obviously still questions which exist with respect to the utility and nature of the NEP items originally developed by Dunlap and Van Liere. From their original conception of a scale which consisted of 12 items, various other scales based on these original 12 have emerged. In addition, the belief that the NEP is a unidimensional scale has been questioned by subsequent researchers who have found varying numbers of dimensions emerging from their data. The notion of multidimensionality is important because it introduces the concept that people are not necessarily consistent in their environmental attitudes and can agree with some aspects of the NEP while rejecting others.

Concerning environmental attitudes and the NEP, there seems to be general acceptance that this scale is a valid and reliable indicator of environmental attitudes but some question exists as to whether it is unidimensional or multidimensional in nature. Different researchers have found evidence to support a varying numbers of dimensions.

There seems to be a progression in the research, however, that would suggest that the NEP is best regarded as multidimensional and that the dimensions which emerge are dependent on variables such as location and the composition of the sample group.

Concerning recreation and environmental attitudes, the study by Dunlap and Heffernan (1975) is important in that it introduced the dichotomy between appreciative and consumptive forms of recreation and provided a framework for subsequent discussion and research. Pinhey and Grimes (1979), Geisler et al., (1977), and other researchers, however, have refuted the findings of Dunlap and Heffernan. More recent researchers however, such as Jackson (1986, 1987), Kuhn and Jackson (1989), and Bikales and Manning 1990), have utilized and revised the NEP to explore the relationship between environmental attitudes and recreation behavour further and their results have generally yielded results to support the hypotheses of Dunlap and Heffernan. Still, there is some question as to what factors are related to environmental attitudes and recreation behaviour and how strong the relationship really is. As well, increases in the quality of measurement of environmental attitudes and research techniques in general have resulted in stronger relationships exhibited between recreation behaviour and environmental attitudes. Jackson's revised environmental attitudes scale, incorporating the original NEP items with DSP items and items from other sources, has received some recognition from other researchers and has yielded some encouraging results in examining the relationship between environmental attitudes and behaviour.

Concerning the relationship between socio-economic variables and environmental attitudes, the results of previous research have been mixed. Geisler et al. (1977) suggested that socio-economic variables were related to environmental attitudes. They observed in their Wisconsin study that there was a stronger association between these variables and environmental attitudes than between recreation styles and environmental attitudes. However, Van Liere and Dunlap suggested that little was known about the relationship between environmental attitudes and socio-economic variable in their survey of previous research. Subsequent researchers have argued that such a relationship exists, however, the associations have not been very strong. Gifford et al. (1983) McStay and Dunlap (1983) both conducted research concerning the relationship between gender and environmental attitudes but their findings did not agree.

There are relatively few recent empirical examinations of the relationship between income and recreational behaviour except when this variable is included with other socio-economic variables in a larger study. Both Van Liere and Dunlap (1980) examined this relationship but found there to be no clear association in the data they reviewed. Samdahl and Robertson found some evidence to support a inverse relationship between income and environmental attitudes.

Geisler et al.(1977), Van Liere and Dunlap (1980) and Honnold (1984) and others have suggested that age is related to environmental attitudes and that with increased age, concern for the environment decreases. The most recent study surveyed, Samdahl and Robertson (1990), did not find that age was related to environmental attitudes.

In general, the research which has been conducted concerning the relationship between socio-economic variables and environmental attitudes has been the most inconclusive, and some researchers have suggested that there is no relationship between these variables and environmental attitudes, However, is this, in fact, true or is there simply a deficiency in the methodologies used to assess the relationship between factors such as sex, income, and age and environmental concern? It is possible the state of the research in this area is like that of environmental attitudes and recreation behaviour 15 years ago; that an improvement in methodologies may uncover relationships that exist that simply are not detected with present research.

Objectives and Hypotheses

In order to address some of the questions presented by previous researchers and to explore these relationships again in a different context, this thesis has four main objectives:

1. To examine recreational behaviour of sample groups in Edmonton to describe the characteristics of this group with respect to recreational activity.
2. To examine environmental attitudes of sample groups in Edmonton to describe these characteristics of this group.
3. To examine the relationship between environmental attitudes and recreation participation of sample groups in Edmonton.
4. To examine socio-economic characteristics of sample groups in Edmonton to measure to what extent they may be related to environmental attitudes.

From these objectives and based on the preceding discussion of relevant research, three hypotheses will be tested in this thesis:

1. Socioeconomic variables are related to environmental attitudes; specifically, women are more pro-environmental than men, younger people more pro-environmental than older people, and higher income individuals more than lower income.
2. Active recreationists have more pro-environmental attitudes than non-active outdoor recreationists.
3. Appreciative recreationists have more pro-environmental attitudes than those who participate in either mechanized or consumptive forms of outdoor recreation.

CHAPTER 3

METHODS

The data for this project were collected during June and July of 1992 using a self-administered questionnaire which was distributed as part of a survey package to sample groups in the city of Edmonton. These packages were either mailed or hand-delivered depending on the sample group involved. Five hundred survey packages were distributed to Edmonton households. The survey package contained a recreation activities questionnaire as its main component which incorporated recommendations from Dillman (1978) concerning questionnaire design. The survey was intended to obtain information on 1) the recreational activities and preferences of individuals in Edmonton; 2) their environmental attitudes; and 3) certain socio-economic attributes of respondents.

Four sample groups were selected for participation in the study. The first sample group consisted of a general population sample (GPS) of 250 selected from all residents of the city of Edmonton who had a telephone number listed in the 1992 Edmonton white pages directory. The other three sample groups were residents of three high income neighbourhoods in Edmonton chosen by such factors as income, education and family structure.

Of the 500 packages that were distributed, a total of 168 were returned. Three of these were not usable, leaving 165 returned surveys from which data could be derived. Initial coding of the data was done manually and transferred to computer-readable files

which were interpreted by using SPSSx. This chapter discusses the development of the survey package and questionnaire which were used, the survey testing and distribution, the sampling methodology and the initial data analysis.

Survey Package

The survey package sent to possible respondents had four components. It included: 1) a covering letter introducing the study and requesting recipients' participation; 2) a self-addressed postage-paid envelope in which to return the completed questionnaire; 3) a form for requesting results of the study when they become available; and 4) the questionnaire itself. Each of these components will be discussed separately.

Covering Letter

The covering letter (see Appendix A) consisted of three sections. The first was an introduction to the objectives and rationale for the project and a request to participate in the study by filling out the questionnaire and returning it. The second section contained general instructions for completing the questionnaire, for example instructions on which member of the household was to complete the questionnaire. The third section thanked the recipient of the survey package in advance for completing the questionnaire. This letter was printed on University of Alberta Department of Geography letterhead to add an official appearance to the survey package.

Questionnaire and Questionnaire Development

The questionnaire (see Appendix B) consisted of 5 sections, comprising 8 pages. The development of the survey generally followed recommendations outlined by Dillman

in *Mail and Telephone surveys: The Total Design Method* (Dillman, 1978). Specifically, the questionnaire incorporated his suggestions on presenting a questionnaire which attempts to first capture and then maintain the interest of the person reading it. This is accomplished by controlling the placement of questions, having some visual interest, and by being generally well-presented and concise.

Recreation Participation

The first section of the questionnaire dealt with recreation participation and measured the frequency of participation in 42 activities. This list consisted of activities in the 1988 *Alberta Recreation and Parks General Recreation Survey* which were distilled down to categories, such as racquet sports for tennis, badminton, racquetball and squash. A five-point scale determined the frequency of participation in each of these by asking the respondent to indicate how often they participated in each activity activities in season using the following categories; 1-Daily, 2 - 1 to 3 times each week, 3 - Less than once each week, 4 - Less than once each month, and 5 - Never.

Environmental Attitudes

This section of the questionnaire contained two sets of environmental attitude statements in order to gain knowledge about the environmental attitudes of the respondents. The first set of statements contained 23 items based on those that corresponded to environmental attitude questions originally developed by Dunlap and Van Liere and modified for use by Jackson (1986, 1987), Kuhn (1988) and Coburn (1994).

Table 3.1 shows each of the statements used, the source for each and the theme based on four environmental attitude dimensions identified by Jackson (1986).

Personal Information

The final section of the questionnaire was a basic socio-economic section. It included questions on age, sex, education, household structure, and income. Following the recommendation of Dillman (1978), this section generally avoided having the respondent answer either open-ended or specific questions about categories such as age and income. Rather, the respondents were asked to indicate the range into which they fell in each of the questions in this section.

Sample Selection

Five hundred questionnaire packages were distributed; 250 to a General Population Sample and 250 to residents in three socio-economically homogenous neighbourhoods in south Edmonton. The General Population Sample (GPS) was selected from the 1992 Edmonton Telephone directory by simply dividing the number of needed respondents into the number of pages in the residential telephone listings. Thus, from each fourth page a single name was selected from the second column of the page to be sent a survey questionnaire. This method was considered acceptable for the scope of this study; the small percentage of people who either do not have a telephone or who have an unpublished number was not considered to be a deterrent to this method of sample selection. If the listing on a particular page was not usable - for example, if it was the listing of a business or a school - then the next residential listing on the page was used. As

Table 3.1
Environmental Attitude Statements

Statement	Original Source	Theme
1 Humans need not adapt to the environment since they can remake it to suit their needs	Dunlap and Van Liere, 1978	Relationship between man and nature
2 To maintain a healthy economy we will have to develop a "steady state" economy where industrial growth is controlled	Dunlap and Van Liere, 1978	Relationship between man and nature
3. There are no limits to growth beyond which our industrialized society cannot expand	Dunlap and Van Liere, 1978	Consequences of science and technology
4. The balance of nature is very delicate and very easily upset	Dunlap and Van Liere, 1978	Limits to the biosphere
5. Canadians are going to have to reduce their consumption of material goods over the next few years	Dunlap and Van Liere, 1984	Limits to the biosphere
6. More emphasis should be placed on teaching children about ecology than about science and technology	Kuhn, 1988	Relationship between man and nature
7. Plants and animals exist primarily to be used by humans	Dunlap and Van Liere, 1984	Relationship between man and nature
8. We cannot keep counting on technology to solve society's problems	Dunlap and Van Liere, 1984	Consequences of sciences and technology
9. Science and technology often do as much harm as they do good	Dunlap and Van Liere, 1984	Consequences of sciences and technology
10. We can continue to raise our standard of living through the application of science and technology	Dunlap and Van Liere, 1984	Quality of Life
11. Humans are severely abusing the environment	Dunlap and Van Liere, 1978	Relationship between man and nature
12. Rapid economic growth often creates more problems than benefits	Dunlap and Van Liere, 1984	Consequence of science and technology

13. The positive benefits of economic growth far outweigh any environmental consequences	Dunlap and Van Liere, 1984	Consequence of science and technology
14. In the long run, there are no limits to the extent to which we can raise our standard of living	Jackson, 1986	Quality of life
15. Economic growth improves the quality of life for all Canadians	Dunlap and Van Liere, 1984	Quality of life
16. Humans must live in harmony with nature in order to survive	Dunlap and Van Liere, 1984	Relationship between man and nature
17. When humans interfere with nature it often produces disastrous consequences	Dunlap and Van Liere, 1984	Relationship between man and nature
18. The earth is like a spaceship with only limited room and resources	Dunlap and Van Liere, 1978	Limits to the biosphere
19. Most problems can be solved by applying more and better technology	Dunlap and Van Liere, 1984	Consequences of science and technology
20. Humans were created to rule over the rest of nature	Dunlap and Van Liere, 1978	Relationship between man and nature
21. We are approaching the limit of the number of people the earth can support	Dunlap and Van Liere, 1978	Limits to the biosphere
22. Humans have the right to modify the natural environment to suit their needs	Dunlap and Van Liere, 1978	Relationship between man and nature
23. In general, the Canadian people would be better off if the nation's economy stopped growing	Dunlap and Van Liere, 1984	Consequences of science and technology

soon as a name was taken from the directory, the correct postal code was appended to it. Once the general Population Sample was completed, each resulting address was sorted by postal code for mail delivery.

The Specific Population Sample was intended to be a homogenous, upper income, upper education and geographically distinct group in Edmonton. The Specific Population Sample was selected from the Edmonton Planning and Development Residential Neighbourhood Fact Sheets, which were originally assembled using Statistics Canada information for each of these neighbourhoods in Edmonton. An initial survey of income information provided on the sheets for all neighbourhoods in Edmonton resulted in the selection of eight neighbourhoods that generally met these specifications. Three neighborhoods were chosen from these eight that had geographic proximity to each other in southwest Edmonton.

The Specific Population Sample was selected by roughly calculating the number of households in each of the three distinct neighbourhoods from the Edmonton neighbourhood fact sheet and dividing the 250 surveys to be distributed by this number to determine which houses would receive a survey package. In this case a survey was delivered to approximately every third household in each of these three neighbourhoods. The households to which the survey packages were hand-delivered were noted at the time so that reminder postcards could be delivered two weeks later.

Survey Testing and Distribution

In February, 1992 the questionnaire was pre-tested on 10 graduate students and faculty members in the Department of Geography at the University of Alberta. Each respondent received a package similar to that intended to be sent to the four sample groups and each was asked to complete the questionnaire using the instructions included. The surveys were returned and the problems the pre-sample respondents had with certain aspects of the questionnaire during this pretest were discussed. The problems determined by this pretest sample were addressed and corrected. The perceived problems in this pretest were essentially with respect to wording and presentation of the different aspects of the survey package rather than content oriented. The revised version was submitted to and approved by the Faculty of Science Ethics Committee.

Sample Response

Of the 500 questionnaires that were distributed, 168 were returned, three of which were unusable. None of the 250 packages which were sent through the postal system was returned as undeliverable. Reminder postcards were hand-delivered to the high-income sample groups approximately 2 weeks following the initial distribution of the surveys. There did not seem to be any relationship between the distribution of the reminder postcard and higher return rates immediately following their distribution; there was no appreciable 'surge' of returns after the postcard was delivered that would indicate that it had any significant effect, as has been seen in other studies. The number of questionnaires returned represents a response rate of 33.6%.

Initial Data Analysis

As the questionnaires were returned a data coding sheet was designed and printed in order to take the data returned from respondents' questionnaires and begin to prepare it for interpretation. Each returned questionnaire received a number identifier as it was received and each distinct question or statement in the questionnaire received a number identifier as well. The information received from each respondent was initially entered manually onto these sheets, with the rows being the number of the respondent and the columns being the number of the question on the survey. The result was a matrix with 165 respondents on the vertical axis with their responses to each of the 126 survey questions and statements along the horizontal axis This gave a total of 20, 790 individual pieces of information with which to deal. Once the process of transferring the responses was completed, 15 respondents were selected at random and their responses to statements in the questionnaire were checked against the completed matrix to test its accuracy. Once it was determined by this process that the data were entered onto the coding sheets accurately, the entire contents of the sheets were entered into a spreadsheet program (Microsoft Excel version 5.0) to continue the process of rendering the data into machine readable and, hence, interpretable form. Again, once the data were transferred to the spreadsheet, random samples were done to check the accuracy of the work. A command file for manipulating the data using SPSSx was created and data manipulation using this file was done on both the MTS mainframe computer at the University of Alberta and on a

PC version of SPSSx to create frequencies and categories for use in Chapter 4 and for bivariate analysis in Chapter 5.

CHAPTER 4

DESCRIPTION AND AGGREGATION OF DATA

There are two purposes to this chapter. The first is to report the recreational participation, environmental attitudes, and socio-economic characteristics of survey participants. The second purpose is to aggregate the above characteristics into meaningful groups for subsequent bivariate analysis and to describe the processes by which these data were aggregated. The goals of this process were to examine if any patterns emerged from the types of recreation activities and environmental attitudes reported and to aggregate variables based on these patterns. The aggregations resulting from this chapter will be used in the analysis of relationships among variables in Chapter 5.

Recreation Variables

Description and Aggregation of Recreation Participation Variables

The nature of respondents' recreation activity, the first section in the questionnaire, was measured by simply asking respondents to indicate how frequently they had participated in each of 42 recreational activities, the selection of which has been previously discussed.

It was made clear to the respondents that they should indicate their frequency of participation only for the last 12 months and also only to indicate their participation with respect to the season in which the activity is normally conducted. If the activity was seasonal, such as skiing or hunting, respondents were asked to report their participation

only for the season in which they would normally take part in the activity. Thus, those who indicated that they had never participated in an activity in the last year were classified as non-participants in that activity even though they may have some familiarity or background with the activity.

The data concerning recreation participation were subjected to initial analysis in two ways to determine patterns in participation rates for activities. First, activities were reported simply by participation in an activity at any time in the previous 12 months. Any indication by respondents that they had participated at all in that activity was counted. Secondly, activities were reported as to whether the respondents engaged in a particular activity with "frequent participation", this being defined as participation in an activity at least once a week in season in the previous 12 months.

Table 4.1 shows both activity participation rates and frequent participation rates for each of the 42 activities in the questionnaire. This table shows a pattern of both high participation and high frequent participation rates in certain activities. The three activities with the highest participation rates were watching television (98.8%), walking for pleasure (95.8%) and reading for pleasure (95.1%). The three activities with the highest frequent participation rates were watching television (88.4%), reading for pleasure (76.7%) and walking for pleasure (57.0%).

There were also activities in which there was little participation or frequent participation. The three activities with the lowest participation were martial arts (3.1 %),

Table 4.1
Recreation Activities: Participation and Frequent Participation Rates

Recreation Activity	Participation (%)	Frequent Participation (%)
Watching television	98.8	88.4
Walking for pleasure	95.8	57.0
Reading for pleasure	95.1	76.7
Attending live theatre/concerts	87.0	6.2
Gardening	85.4	48.2
Visiting a museum/art gallery	81.4	2.5
Attending educational courses	76.5	14.2
Attending sports events	75.0	4.4
Swimming in pools	66.7	11.1
Driving	66.0	11.7
Bicycling	65.4	20.4
Dancing	57.1	1.2
Day hiking	54.3	9.3
Swimming in lakes	50.0	5.6
Golf	43.5	16.8
Cross country skiing	43.2	1.9
Ice skating	42.5	3.1
Overnight camping	41.7	1.8
Downhill skiing	39.3	2.5
Court games	37.0	11.1
Jogging/running	32.7	13.0
Fishing	32.1	0.6
Playing video games	29.4	2.5
Tobogganing	26.9	0.6
Softball/baseball	26.5	4.3
Canoeing	24.4	1.2
Weightlifting	23.5	11.1
Motor boating	22.7	2.5
Mountain biking	21.5	3.7
Sailing	17.2	0.0
Hockey	15.4	6.2
Waterskiing	14.2	1.2
Football	13.6	1.2
Sailboarding/windsurfing	12.9	1.8
Horseback riding	12.3	2.5
ATV/off road vehicles	11.9	1.3
Hunting	8.0	1.9
Snowmobiling	7.4	0.0
River rafting	3.7	0.6
Martial arts	3.1	0.0
Motorized trail riding	2.5	0.0
Skateboarding	1.2	0.6

*Activities are listed in descending order of participation

motorized trail riding (2.5%) and skateboarding (1.2%). There were four activities with the no frequent participation: sailing, snowmobiling, martial arts and motorized trail riding.

The results of this initial aggregation provides some broad speculation on the patterns of recreation participation within the sample group. Activities that are home-based and relatively simple have a high level of both participation and frequent participation. Activities such as gardening, walking for pleasure and watching television are examples of these activities. Activities that were associated with a high degree of skill, a high level of fitness or a high probability of injury are activities that had both a low level of participation and frequent participation; for example, skateboarding and karate.

There were certain activities with a large difference between their participation rates and frequent participation rates. These activities exhibited two basic patterns; those activities with high participation rates but with low frequent participation, such as attending live theatre and concerts, attending museums/art galleries, and attending sports events. This pattern suggests that recreation activities which did not involve direct participation had a generally low level of dedication by the participants in that activity. There were also activities that exhibited this pattern that could result from the nature of the activity; for example, fishing and downhill skiing may have factors associated with each that mitigate against frequent participation such as cost or proximity to opportunities for participation.

There were also activities with generally low participation rates that had relatively high frequent participation, such as such as jogging/running and weightlifting. This pattern

could suggest activities in which participants have a high level of dedication, such as golf, or are relatively easy to participate in, such as walking or gardening. This pattern could also result from the nature of the activity. For example, activities such as running and weightlifting are activities that require regular participation to derive benefit from participating in them.

Outdoor Recreation Activities

The next step taken in examining recreation participation was to determine which of the 42 recreation activities included in the questionnaire may have some relationship to environmental attitudes. There are many activities for which information was collected that likely do not have any relationship with environmental behaviour and which may be excluded without affecting subsequent analysis of this relationship.

Of the 42 recreational activities for which information was collected, those activities that are conducted indoors were initially excluded. The argument can be made that these activities may not have any relationship to environmental attitudes. It is likely, for example, that watching television, reading, or playing video games do not have a direct relationship to environmental attitudes. After these activities had been excluded, there were 29 activities which remained that were essentially outdoor in nature. Two additional activities may be considered either indoor or outdoor, but with Edmonton's climate these (hockey and ice skating) were categorized as "indoor". While these are ideally outdoor activities and their enjoyment enhanced by being conducted outdoors, in reality it is likely that most participation in Edmonton over an entire year in these activities is indoors in

skating arenas. These activities were also excluded. In addition, there were other activities that primarily an outdoor activity, such as attending sports events, but which were also excluded because of their non-participatory nature.

Table 4.2
Outdoor Recreation Activities

Recreation Activity	Participation (%)	Frequent Participation (%)
Bicycling	65.4	20.4
Day hiking	54.3	9.3
Swimming outdoors	50.0	5.6
Cross-country skiing	43.2	1.9
Overnight camping	41.7	1.8
Downhill skiing	39.3	2.5
Jogging/running	32.7	13.0
Fishing	32.1	0.6
Canoeing	24.4	1.2
Motor boating	22.7	2.5
Mountain biking	21.5	3.7
Sailing	17.2	0.0
Waterskiing	14.2	1.2
Horseback riding	12.3	2.5
ATV/off-road vehicles	11.9	1.3
Hunting	8.0	1.9
Snowmobiling	7.4	0.0
River rafting	3.7	0.6

*Activities are listed in descending order of participation

There were 5 outdoor activities with participation rates below 10%: hunting, snowmobiling, river rafting, motorized trail riding, and skateboarding. These activities did not have large enough participation rates to be important in the scope of this study except for hunting and snowmobiling; two activities that are cited in previous research upon which this study is based. River rafting was kept as an example of an extremely rigourous outdoor activity. In the end, there were a total of eighteen exclusively outdoor activities used for subsequent analysis in this thesis. Table 4.2 lists these eighteen outdoor activities with their participation and frequent participation rates arranged in descending order of participation rate.

Cluster Analysis and the Development of Recreation Styles

Although some patterns emerge from examining only participation and frequent participation in recreation activities, employing other methods of analysis may have greater explanatory power and may be more useful for subsequent bivariate analysis. Patterns that do not suggest themselves when using simple measures of participation or even frequent participation may emerge with more sophisticated manners of aggregation.

Cluster analysis was used to classify respondents into sub-groups by their similarities in the type, number, intensity and combinations of their recreation activities. In previous studies that were not cluster-based three different recreation styles emerged: appreciative, mechanized and consumptive recreation styles. Thus, it was decided to select three clusters for initial analysis. If these three groups emerged, this result would confirm

this previous research conducted by Jackson (1986), Van Liere and Noe (1981) and Dunlap and Heffernan (1975).

The cluster analysis of recreation activities in this study was conducted using the SPSSx *Quick Cluster* program. Initial cluster analysis was conducted using the three cluster points, on the assumption that the same three recreation styles seen in previous research would emerge from this data.

The 3-cluster analysis with respondents did not reveal these recreation types, however, probably because of the limitations of the size of the sample. When two cluster points were used in subsequent cluster analysis, two distinct recreation types emerged; active and non-active recreationists. Table 4.3 shows the final cluster centres which distinguishes each cluster from others for the outdoor activities determined earlier in this chapter.

Table 4.3
Final Cluster Centres (mean scores) for Participation Rates in 18 Outdoor Activities-Active and Non-Active Recreationists

Recreation Activity	Active Recreationist Mean	Non-Active Recreationist Mean
ATV/off-road vehicles	.23	.05
Bicycling	.90	.05
Canoeing	.54	.06
Cross-country skiing	.74	.25
Day hiking	.89	.24
Downhill skiing	.71	.20
Fishing	.48	.23
Horseback riding	.23	.06
Hunting	.11	.06
Jogging/running	.54	.20

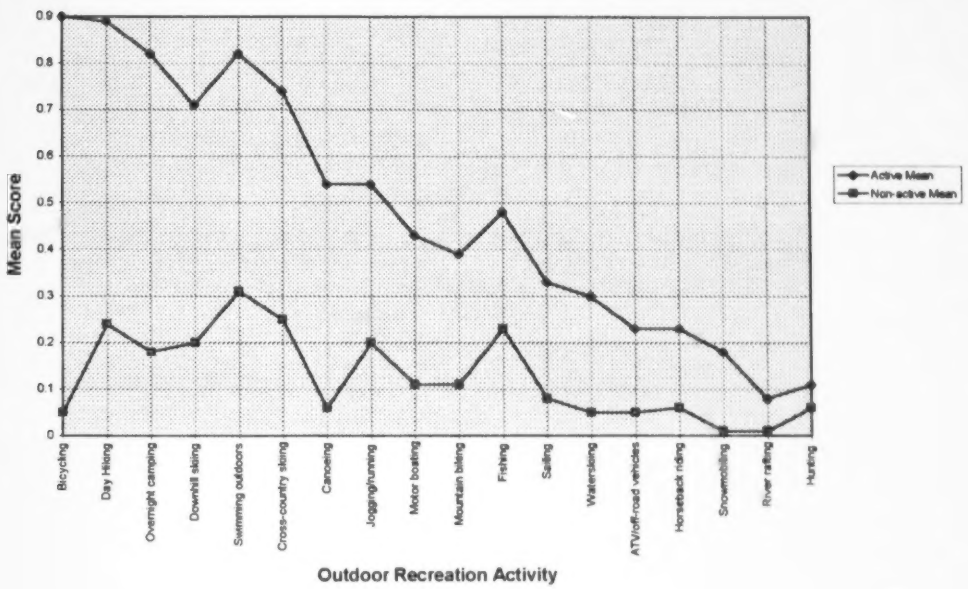
Motor boating	.43	.11
Mountain biking	.39	.11
Overnight camping	.82	.18
River rafting	.08	.01
Sailing	.33	.08
Snowmobiling	.18	.01
Swimming outdoors	.82	.31
Waterskiing	.30	.05

Number of Cases in each cluster - Active Recreationists = 62; Non-active Recreationists = 102
Missing Cases = 1

There were 62 respondents classified as active recreationists (37.8%) and 102 respondents that were classified as non-active (62.2%). Figure 4.1 shows the mean scores in each activity in descending order of magnitude of the difference. The differences in the mean scores for these activities suggested the labels active and non-active recreationists. For example, the three activities with the highest difference in means between the two clusters were bicycling, hiking and overnight camping. Those activities with a lower level of activity, such as snowmobiling and ATV/off-road vehicles, had a much smaller difference in mean scores.

Subsequent cluster analysis was conducted using only respondents assigned to the active cluster determined from the first analysis. Taking the active recreationists only, cluster analysis revealed two distinct subgroups. Table 4.4 shows the final cluster centres which distinguishes each cluster from others for the outdoor activities. By examining the types of recreation activities that emerged in each cluster there were 45 respondents in this

Figure 4.1 - Final Cluster Centre Mean Scores for 18 Outdoor Activities - Active/Non-active Recreationists



subgroup classified as appreciative recreationists (72.6%) while the remaining 17 were classified as mechanized recreationists (27.4%).

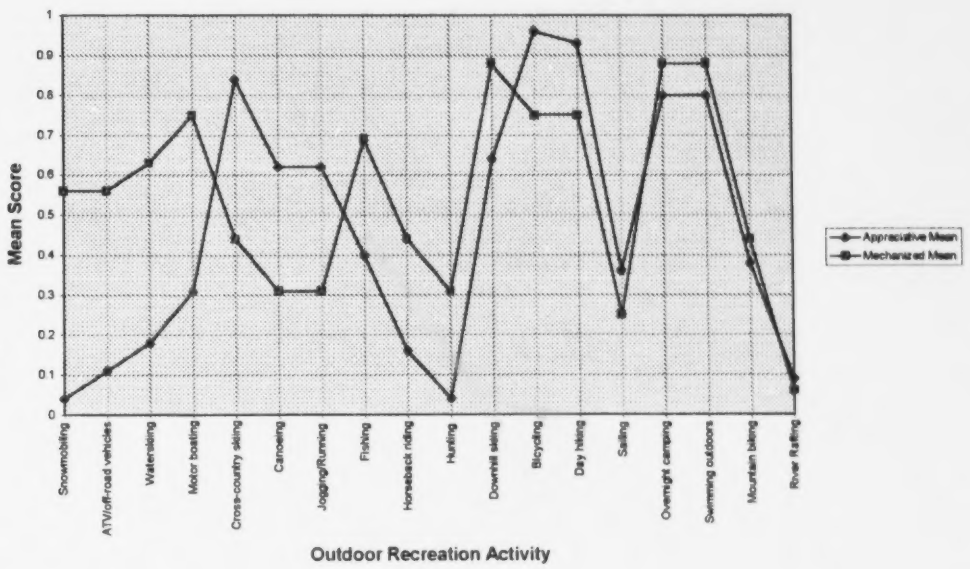
Figure 4.2 shows the means scores of each activity in descending order of the magnitude of the difference. This suggests that activities that could be considered appreciative had similar activity patterns. The largest difference in mean scores with this cluster analysis was with snowmobiling and ATV/off-roading, waterskiing and motorboating. At the other extreme, the smallest difference in mean scores existed with overnight camping, swimming outdoors, mountain biking and river rafting which could be considered appreciative outdoor recreation pursuits. This supports the classification by appreciative and mechanized relationships.

Table 4.4
Final Cluster Centres (mean scores) for Participation Rates in 18 outdoor activities Appreciative and Mechanized recreationists

Recreation Activity	Appreciative Recreationist Mean	Mechanized Recreationist Mean
ATV/off-road vehicles	.11	.56
Bicycling	.96	.75
Canoeing	.62	.31
Cross-country skiing	.84	.44
Day hiking	.93	.75
Downhill skiing	.64	.88
Fishing	.40	.69
Horseback riding	.16	.44
Hunting	.04	.31
Jogging/Running	.62	.31
Motor boating	.31	.75
Mountain biking	.38	.44
Overnight camping	.80	.88
River Rafting	.09	.06
Sailing	.36	.25
Snowmobiling	.04	.56
Swimming outdoors	.80	.88
Waterskiing	.18	.63

Number of Cases in each cluster - Appreciative Recreationists = 45; Mechanized Recreationists = 17
Missing Cases = 0

Figure 4.2 - Final Cluster Centre Mean Scores for 18 Outdoor Recreation Activities - Appreciative/Mechanized Recreationists



Environmental Attitude Data

Development of Environmental Attitude Dimensions

Table 4.5 shows the mean scores for responses to each of the environmental attitude statements. A lower mean score represents responses that are considered more pro-environmental than a higher score. There were some patterns which existed with respect to the mean environmental attitudes scores. Statements with generally lower mean scores were related to the issues as concern over the balance between humans and the natural environment. For example, the statement with the lowest mean score (1.53) was concerned with how humans ought not to adapt to the environment to meet our needs. Statements with mean scores close to the theoretical mean were more concerned with the

Table 4.5
Mean Scores of Environmental Attitude Statements

Statement	Mean Score
1. Humans need not adapt to the environment since they can remake it to suit their needs.	1.53
16. Humans must live in harmony with nature in order to survive.	1.56
4. The balance of nature is very delicate and very easily upset.	1.64
11. Humans are severely abusing the environment.	1.67
18. The earth is like a spaceship with only limited room and resources.	1.81
5. Canadians are going to have to reduce their consumption of material goods over the next few years.	1.82
7. Plants and animals exist primarily to be used by humans.	1.95
20. Humans were created to rule over the rest of nature.	1.95
13. The positive benefits of economic growth far outweigh the environmental. consequences	1.95
17. When humans interfere with nature it often produces disastrous consequences	2.01
8. We cannot keep counting on technology to solve society's problems.	2.21
3. There are limits to growth beyond which our industrialized society cannot expand.	2.26
12. Rapid economic growth often creates more problems than benefits.	2.27
14. In the long run, there are no limits to the extent to which we can raise our standard of living.	2.28
22. Humans have the right to modify the natural environment to suit their needs.	2.37
21. We are approaching the limit of the number of people the earth can support.	2.47
2. To maintain a healthy environment we will have to develop a "steady state" economy where industrial growth is controlled	2.52

9.	Science and technology often do as much harm as they do good	2.79
15.	Economic growth improves the quality of life for all Canadians	2.84
19.	Most problems can be solved by applying more and better technology.	2.96
6.	More emphasis should be placed on teaching children about ecology than about science and technology.	3.03
10.	We can continue to raise our standard of living through the application of science and technology	3.54
23.	In general, the Canadian people would be better off if the nation's economy stopped growing.	3.73

*Statements are listed in ascending order of mean score

role of the economic growth and the state of the environment. For example, the statement concerning the balance between a "steady state" economy and the control of industrial growth had a mean score of 2.52. Statements that were concerned with technical solutions to environmental problems and the concern for the maintenance of a high standard of living had higher scores. In general terms, it appears from this initial analysis that there was a high level agreement among respondents that humans are abusing the environment and that there is a concern with environmental decline but the solutions that were preferred had a technological basis. This type of cursory analysis, however, does not indicate if any significant patterns exist that may be useful in subsequent analysis. This number of individual mean scores are too many to use effectively for bivariate analysis and would obscure the detection of general patterns in relationships.

In order to increase the value of the information from these statements for use in Chapter 5, each environmental attitude statement was classified into one of five dimensions using the four dimension environmental dimension classification developed by Jackson (1986) as a basis. Factor analysis did not reveal any clear dimensions so the use of a modified version of Jackson's classifications was considered appropriate for this study. He determined that each of the environmental attitude statements in his questionnaire could be classified into different dimensions based on the underlying belief associated with statement involved; for example, several statements in his study were related to a particular view of the relationship between humans and nature, while other were related to, for example, the nature of solutions to environmental problems.

Based on Jackson (1986), five dimensions were developed for this study: 1) negative consequences of growth and technology, 2) the relationship between man and nature, 3) quality of life, 4) limits to the biosphere, and 5) technical solutions to environmental issues. Table 4.6 shows how each of the 23 environmental attitude statements used in this study were classified into these five dimensions. The mean scores for each of the dimensions are shown in Table 4.7. Respondents had the most pro-environmental attitudes concerning statements related to the relationship between humans and nature (mean score = 1.98) and were least pro-environmental with respect to statements that dealt with technical solutions to environmental decline (mean score = 2.89). This suggests that respondents were concerned about the human/nature relationship but tend to support technical solutions to the problems they saw. In general, the mean

Table 4.6
Environmental Attitude Statements Classified by Environmental Dimension

Negative consequences of growth and technology

1. To maintain a healthy economy we will have to develop a "steady state" economy where industrial growth is controlled.
2. There are limits to growth beyond which our industrialized society cannot expand.
3. Science and technology often do as much harm as they do good.
4. In general, Canadian people would be better off if the nation's economy stopped growing.

Relationship between humans and nature

1. Humans need not adapt to the environment since they can remake it to suit their needs.
2. Plants and animals exist primarily to be used by humans.
3. Humans must live in harmony with nature in order to survive.
4. When humans interfere with nature it often produces disastrous consequences.
5. Humans were created to rule over the rest of nature.
6. Humans have the right to modify the natural environment to suit their needs.

Quality of life

1. Canadians are going to have to reduce consumption of material goods over the next few years.
2. The positive benefits of economic growth far outweigh any environmental consequences.
3. Economic growth improves the quality of life for all Canadians.

Limits to the biosphere

1. The balance of nature is very delicate and very easily upset.
2. Humans are severely abusing the environment.
3. Rapid economic growth often creates more problems than benefits.
4. In the long run, there are no limits to the extent to which we can raise our standard of living.
5. The earth is like a spaceship with only limited room and resources.
6. We are approaching the limit of the number of people the earth can support.

Technical Solutions to Environmental problems

1. More emphasis should be placed on teaching children about ecology than about science and technology.
2. We cannot keep counting on technology to solve society's problems.
3. We can continue to raise our standard of living through the application of science and technology.
4. Most problems can be solved by applying more and better technology.

scores for each dimension suggest that the respondents are environmentally inclined, since respondents scored lower than the theoretical mean on the dimensions which concerned with the relationship between humans and nature, quality of life and limits to the biosphere.

Table 4.7
Environmental Dimension Environmental Attitudes Mean Scores

	Mean Score	Number
Negative consequences of growth and technology	2.62	156
Relationship between humans and nature	1.98	157
Quality of life	2.43	159
Limits to the biosphere	2.24	155
Technical Solutions to environmental problems	2.89	155

Description of Environmental Attitude Variables

The environmental attitudes of each respondent were measured by the strength of their responses to 23 statements about the state of environment and human interaction with this environment. This allowed for determining a total mean score on all of the items. A low total score represents an ecocentric position while a high score represents a technocentric.

Environmental attitude statement responses were aggregated simply by adding each respondent's score on each statement to determine the total of their responses for the section. The lowest possible score is 23 which would indicate a high concern for the

environment and the highest possible score is 115, which would indicate a low concern for the environment. Table 4.8 shows distribution of total environmental attitude scale scores.

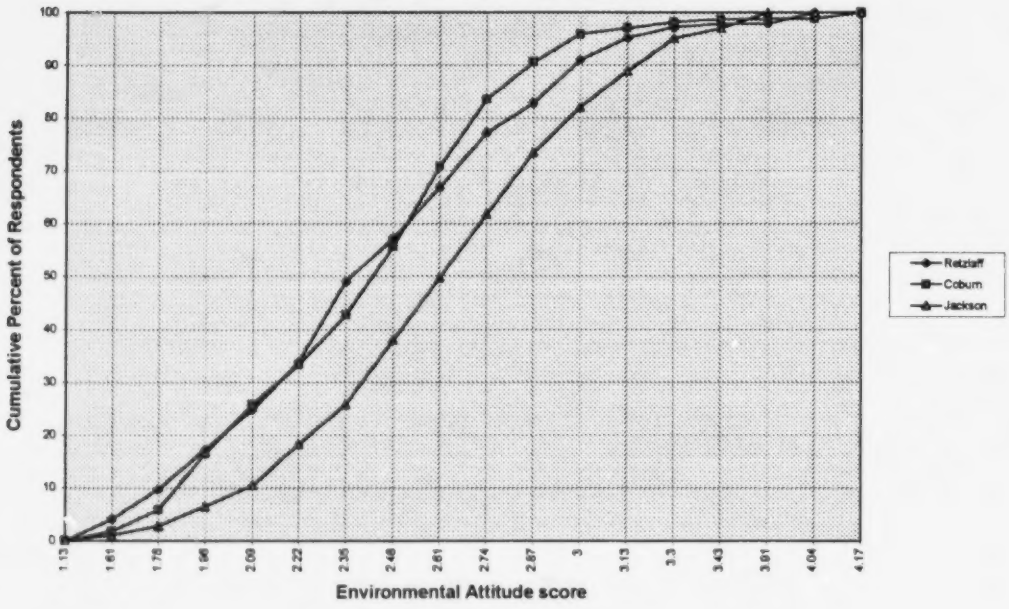
Table 4.8
Environmental Attitude Scale Scores

Score	n	%	Cum.%	Score	n	%	Cum.%
27	1	0.7	0.7	56	4	2.8	54.5
28	1	0.7	1.4	57	4	2.8	57.2
31	1	0.7	2.1	58	6	4.2	61.4
35	1	0.7	2.8	59	4	2.8	64.1
36	1	0.7	3.4	60	4	2.8	66.9
37	1	0.7	4.1	61	2	1.4	68.3
38	1	0.7	4.8	62	8	5.6	73.8
39	3	2.1	6.9	63	5	3.4	77.2
40	2	1.4	8.3	64	2	1.4	78.6
41	2	1.4	9.7	65	2	1.4	80.0
42	2	1.4	11.0	66	4	2.8	82.8
43	4	2.8	13.8	67	2	1.4	84.1
44	2	1.4	15.2	68	5	3.4	87.6
45	3	2.1	17.2	69	5	3.4	91.0
46	3	2.1	19.3	70	3	2.1	93.1
47	4	2.8	22.1	71	1	0.7	93.8
48	4	2.8	24.8	72	2	1.4	95.2
49	4	2.8	27.6	73	1	0.7	95.9
50	5	3.4	31.0	76	2	1.4	97.2
51	4	2.8	33.8	79	1	0.7	97.9
52	10	7.0	40.7	82	1	0.7	98.6
53	5	3.4	44.1	84	1	0.7	99.3
54	7	4.9	49.0	93	1	0.7	100.0
55	4	2.8	51.7				

Range = 27-93
Number of Missing Cases =20
Number of Valid Cases =145
Theoretical mean =69 Theoretical Range = 23 - 115

To determine if the distribution for the respondents to this study is supported by previous studies, the distributions from two previous studies were compared to the distribution of this study. Figure 4.3 shows this cumulative scores for Jackson's study (1986) and Coburn's (1994) with data from this study.

Figure 4.3 - Comparison of Cumulative Environmental Attitude Scores - Retzlaff, Coburn (1994) and Jackson (1986)



This figure shows that the respondents to this study were more pro-environmental than Jackson's sample but were also similar in nature to those sampled by Coburn. The similarity to the data returned by Coburn, who used a similar sample size and sampling technique, supports the validity of measurement of the environmental attitudes of this study.

Identification of Ecocentric, Moderate, and Technocentric Groups

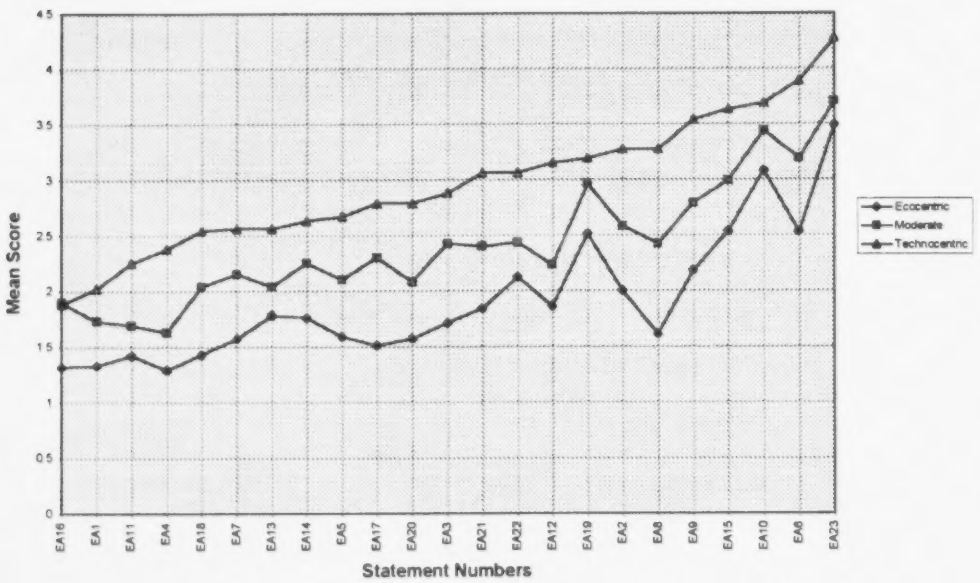
Using the mean scores for each of the 23 statements it is possible to aggregate the respondents further to develop a classification that would be useful in bivariate analysis by developing environmental groups. When the respondents were aggregated into quartiles based on environmental attitude mean scores the resulting aggregations were considered too small to have much descriptive value. When the respondents were aggregated into thirds the classification resulted in three groups that were judged large enough for subsequent bivariate analysis. This classification resulted in three groups of roughly equal size which respondents were considered ecocentric, moderate, and technocentric. This categorization represented a balance between fragmentation of respondent and total aggregation into one group that would have no descriptive value.

Verification of Environmental Attitudes Groups and Dimensions

To determine if the "thirds" solution for the subdivision of the environmental attitudes frequency distribution was reliable in identifying individuals with ecocentric, moderate and technocentric environmental orientations, the groups were examined for consistent mean scores on each of the 23 environmental attitudes scale statements. This analysis was conducted using an analysis of variance of each of the three groups on the statements. Figure 4.4 shows that the mean scores were lower for ecocentrics than moderates and moderate mean scores were lower than technocentrics in all the environmental attitudes statements except for statement 16: "Economic growth improves the quality of life for all Canadians." Regarding this statement, technocentrics scored

slightly lower than moderates. Technocentrics otherwise had consistently higher mean scores than either moderates and ecocentrics. Moderates in every case had mean scores higher than ecocentrics but in within the range between ecocentrics and technocentrics.

Figure 4.4 - Mean Scores of Ecocentric, Moderate, and Technocentric Groups on 23 Environmental Attitude Statements

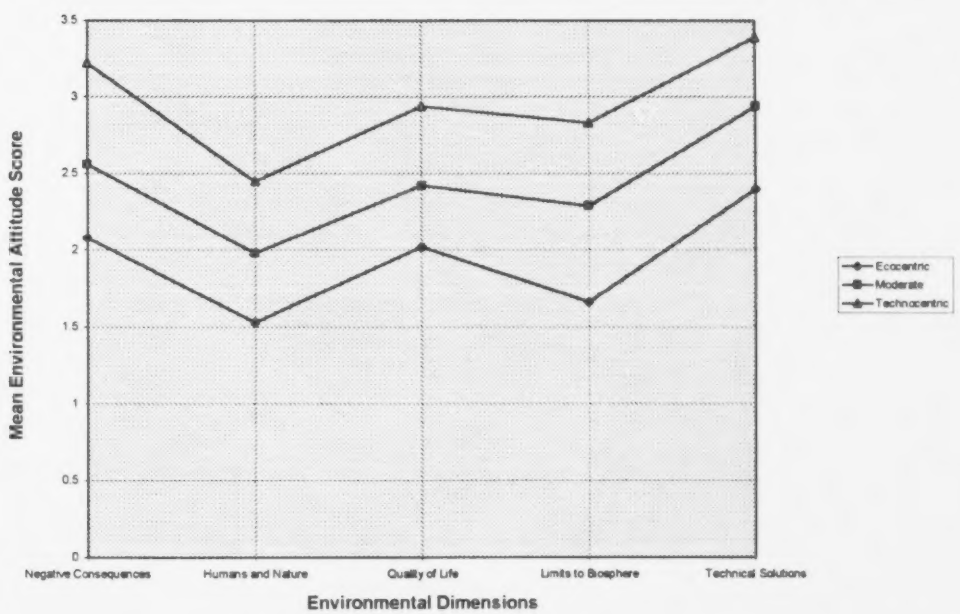


Further verification of the distinctness of ecocentrics, moderates, and technocentrics is shown by comparing each of these three groups to the five dimension scale previously developed. In a manner similar to the first verification, ecocentrics, moderates and technocentrics were examined for consistent mean scores on each of the five dimensions. Figure 4.5 shows the analysis of these relationships. Ecocentrics showed

lower mean scores for all dimensions, and moderates also showed lower mean scores than technocentrics in all the comparisons.

These results confirm the distinctness of the three environmental attitude groups developed in this chapter. These groups reliably represent three groups of individuals with distinct ecocentric, moderate and technocentric orientations and will thus be used for bivariate analysis on Chapter 5.

Figure 4.5 - Environmental Dimensions by Environmental Groupings



Socio-economic Variables

Respondents were asked in the questionnaire to provide information about themselves; specifically age, household income, level of education and household structure. This information, except for level of education was aggregated a number of

ways depending on the type of information in order to establish categories for subsequent bivariate analysis.

Age Aggregation

With respect to age, respondents were asked to indicate the year in which they were born. These responses were subtracted from the year in which the survey was administered to determine the actual age of each respondent. The age of respondents ranged from 20 to 79 years. Four respondents declined to indicate their age. This information is shown in a Table 4.9. This information was initially aggregated into five-year cohorts but the numbers in each of these groups were too small for comparison purposes. Eventually, respondents were classified into four groups of similar size; those 30 and under, 31-45, 46-60, and 61+. This categorization represents four groups that are large enough to be able to compare these groups to other variables and which bear some relationship to lifecycle considerations. The numerically smallest group using this type of categorization are those under 30. It was decided, however, not to increase the upper age limit simply in order to increase the number in the category to make a group as large as the other three. It was felt that explanatory power would be lost in having too wide a range of ages in one category.

Income Aggregation

With income, respondents were asked to indicate the range in which the household's total annual income fell. Total household income was first aggregated into $5,000 increments but this left each category too small for comparison purposes to

Table 4.9
Age Range of Respondents

Age	Frequency	Age	Frequency
20	2	49	7
21	2	50	3
22	1	51	4
24	2	52	4
25	3	53	5
26	4	54	1
27	2	55	4
28	1	56	5
29	6	57	4
30	2	58	3
32	1	59	3
33	1	60	1
34	1	61	4
35	2	62	3
36	3	63	4
37	4	64	4
38	3	65	2
39	5	66	2
40	5	67	4
41	2	68	3
42	3	69	5
43	2	71	4
44	3	72	3
45	4	73	1
46	4	74	3
47	3	75	2
48	1	79	2

Range = 20-79
Number of Missing Cases = 4
Number of Valid Cases = 161
Theoretical Mean =49.5

other variables. Income categories were gradually classified into three groups; those households with a total income under $30,000, $30,000 to 70,000, and over $70,000. A total of 12 respondents did not indicate their household income. It is important to note that upper-income families were over-represented in this study because of the sampling done in three high-income neighbourhoods in Edmonton.

Gender Aggregation

The sex of the respondents was categorized into male and female. There were more females than males in the sample group; 89 women responded to the questionnaire while only 75 men responded. One respondent did not indicate gender, leaving 164 respondents for which there was information on gender.

Summary

The characteristics reported by respondents were classified for use in subsequent bivariate analysis in different manners according to the type of variable. Recreation activities were first examined by simple participation and frequent participation to determine initial patterns of participation to see if any emerged that may be useful. Then, the complete set of recreation activities was reduced to eighteen outdoor activities which were later used in cluster analysis. As well, recreational activities underwent cluster analysis to determine if any patterns would emerge through this process. Two different clusters emerged, one a subset of the other. The first cluster defined active and non-active recreation types, and the subsequent cluster of active recreationists revealed appreciative and mechanized recreation types.

Environmental attitudes were first aggregated to report overall environmental attitude statement scores and then the mean scores for each of the statements. Environmental attitude statements were classified based on Jackson's classification but with five environmental dimensions instead of four. As well environmental attitudes classified into three distinct groups of environmental attitudes types, ecocentric, moderate, and technocentric. The distinct nature of these groups was verified by comparing the 23 environmental attitudes statements with both the development of ecocentric, moderate, and technocentric groups as well as the environmental dimensions.

Socio-economic attributes were classified differently depending on the attribute concerned. Income was categorized into three income groupings. Age was categorized into four age groupings , and gender was categorized simply by male and female.

CHAPTER 5

RELATIONSHIPS BETWEEN SOCIO-ECONOMIC VARIABLES, ENVIRONMENTAL ATTITUDES AND RECREATION PARTICIPATION: RESULTS OF THE BIVARIATE ANALYSIS

Chapter 4 presented each of the recreation participation, environmental attitudes, and socio-economic variables and developed aggregations for each of these variables. The purpose of this chapter is to use the aggregated variables developed in Chapter 4 in order to examine bivariate relationships among these three sets of variables. This is to test the hypotheses presented in Chapter 2. In the data which are nominal chi-square tests, rather than correlation or regressions, will be used to assess the presence or absence of significant relationships between each pair of variables. The significance level used to distinguish between significant and non-significant relationships throughout these analyses is 0.05.

Hypotheses for Examination

Three hypotheses to be tested in this study were presented at the beginning of this thesis. These are restated as follows:

1. Socioeconomic variables are related to environmental attitudes; specifically, women are more pro-environmental than men, younger people more pro-environmental than older people, and higher income individuals more pro-environmental than lower income people.

2. Active recreationists have stronger pro-environmental attitudes than non-active outdoor recreationists.
3. Appreciative recreationists have stronger pro-environmental attitudes than those who participate in either mechanized or consumptive forms of outdoor recreation.

Socio-economic Variables and Environmental Attitudes

Gender and Environmental Attitudes

Table 5.1 shows the results of the analysis of relationships between environmental attitudes based on the three-point grouping into ecocentric, moderate and technocentric respondents and gender. The result of this analysis suggested that women have stronger pro-environmental attitudes than men, although the relationship was not significant. Almost half the women (45.2%) were ecocentric while the remainder of the women were almost evenly split between being either moderate or technocentric: 28.8 and 26.0 percent respectively. Men, in comparison, were predominantly technocentric. Of the men who responded to the survey, 40.3 percent were classified as technocentric while moderate men constitute 37.5 percent of male respondents, and the remainder, 22.2 percent, were ecocentric.

When gender was compared to environmental attitudes mean scores, the relationship was significant; the mean score for women in the sample on the 23 environmental attitude statements was 1.8 while the mean score for men was 2.2. This lends support to part of the first hypothesis, that socio-economic variables have a relationship to environmental attitudes.

Table 5.1
Environmental Attitude Groups by Gender

	Male (%)	Female (%)
Ecocentric	22.2	45.2
Moderate	37.5	28.8
Technocentric	40.3	26.0
Total (n)	(72)	(73)

Chi-square = 8.72; d.f.=2; Not significant

Age and Environmental Attitudes

Table 5.2 shows the result of the analysis of relationships between ecocentric, moderate and technocentric environmental attitude groups and age categories developed in Chapter 4. The result showed variation in the relationship that would suggest that older people are more technocentric than younger people, but the results of this relationship also indicate that the relationship was not statistically significant. Although the relationship did not have chi-square significance, it did show a reasonably consistent pattern that would suggest that age is negatively related to pro-environmental attitudes. While 21.7 percent of those aged 30 and under were technocentric, this figure increases with age. Technocentrics comprised 46.2 percent of those aged 61 and over. As well, of those 61 years and older, only 25.6% were ecocentric, 28.2% were moderate, while 46.2% were

technocentric. When age was compared using mean scores for each of the age categories, there were no significant relationships and the results did not suggest any patterns that support the first hypothesis.

Table 5.2
Environmental Attitude Groups by Age

	30 and under (%)	31-45 (%)	46-60 (%)	61 and over (%)
Ecocentric	39.1	47.1	28.9	25.6
Moderate	39.1	29.4	37.8	28.2
Technocentric	21.7	23.5	33.3	46.2
Total (n)	(23)	(34)	(45)	(39)

Chi-square = 7.90; d.f.=6: Not significant

Income and Environmental Attitudes

Table 5.3 shows the results of the analysis of the relationship between ecocentric, moderate and technocentric environmental attitude groups and income categories developed in Chapter 4. The result suggests that people from higher income households are less ecocentric than people from lower income households although the relationship was not statistically significant. This relationship does not have chi-square significance and

does not show any pattern that would suggest that household income is related to environmental attitudes.

Table 5.3
Environmental Attitude Groups by Household Income

	Under $30 000 (%)	$30-70 000 (%)	Over $70 000 (%)
Ecocentric	41.7	34.5	29.6
Moderate	25.0	30.9	36.6
Technocentric	33.3	34.5	33.8
Total (n)	(12)	(55)	(71)

Chi-square = 1.14; d.f.=4; Not significant

When the same income categories were compared with environmental attitude mean scores for each group, no clear patterns emerged which shows any relationship between the two variables. Those with household incomes over $70 000 annually had higher mean scores, but the other two income categories had mean scores that were virtually identical. This relationship did not have statistical significance.

The Relationship between Outdoor Recreation Participation and Environmental Attitudes

In this section, relationships between the two sets of cluster groups derived from the cluster analysis done in Chapter 4 are examined with reference to environmental attitude data also aggregated in that chapter. The results of the two clusters developed in Chapter 4 (active/non-active and appreciative/mechanized) were compared with both the three environmental attitude groups (ecocentrics, moderates, and technocentrics) and mean environmental attitude scores to test the second and third hypotheses.

Active Non-active Clustering and Environmental Attitudes

Table 5.4 shows the results of the analysis of the relationship between active and non-active recreationists and ecocentric, moderate and technocentric environmental attitude groups.

Table 5.4
Environmental Attitude Groups by Active/Non-active Recreationists

	Ecocentric (%)	Moderate (%)	Technocentric (%)
Active	46.9	45.8	21.3
Non-active	53.1	54.2	78.7
Total (n)	(53)	(58)	(51)

Chi-square = 8.47; d.f.=2; $p < 0.01$

The relationship shows that recreation participation type had a significant relationship to the environmental attitudes grouping of respondents. Active recreationists who were either ecocentric or moderate in their environmental attitudes had similar active recreation participation rates (46.9 and 45.8% respectively) while technocentrics had a much lower active recreation participation rate (21.3%). Non-active recreationists who were either ecocentric or moderate respondents had similar active recreation participation rates (53.1 and 54.2% respectively) while technocentrics had a much higher non-active recreation participation rate (78.7%). This relationship lend support to the second hypothesis.

When the environmental attitude mean scores between active and non-active recreationists were compared the relationship also was significant. Active recreationists' mean score was 2.31 while non-active recreationists had a mean score of 2.49 with an F-value of 4.7 and $p<0.031$. Thus, those involved in active outdoor recreation activities, such as cross-country skiing, had significantly stronger pro-environmental attitude statement scores than those involved in non-active outdoor recreation participation. The results from this relationship lend support to the second hypothesis that active recreationists are more pro-environmental than non-active recreationists.

Appreciative Mechanized Clustering and Environmental Attitudes

Table 5.5 shows ecocentric, moderate and technocentric environmental attitude groups compared by appreciative and mechanized styles of outdoor recreation. This relationship was not statistically significant. The result of the analysis, however, suggested

appreciative recreationists who were either ecocentric or moderate in their environmental attitudes had similar appreciative recreation participation rates (78.3 and 72.7% respectively) while technocentrics had a lower appreciative participation rate (50.0%). Mechanized recreationists who were either ecocentric or moderate had similarly low participation rates (21.7 and 27.3% respectively) while technocentrics had a higher mechanized participation rate (50.0%).

Table 5.5
Environmental Attitude Groups by Appreciative/Mechanized Recreationists

	Ecocentric (%)	Moderate (%)	Technocentric (%)
Appreciative	78.3	72.7	50.0
Mechanized	21.7	27.3	50.0
Total (n)	(53)	(58)	(51)

Chi-square = 2.79; d.f.=2; Not significant.

When the environmental attitude mean scores between appreciative and mechanized recreationists were compared the relationship was statistically significant. The environmental attitude mean score for the appreciative cluster was 2.23 while the mean for the mechanized cluster was 2.50 with an F-value of 3.4 and $p<0.025$.

Although the relationship between the appreciative and mechanized recreation styles and the three categories of environmental attitude groups was not significant, the statistically significant relationship between the appreciative and mechanized recreation and environmental attitude mean scores lends support to the third hypothesis. When mean scores were compared, appreciative outdoor recreation participation styles were associated with pro-environmental attitudes in the hypothesized direction.

The Relationship Between Outdoor Recreation Styles and Environmental Dimensions

Active Non-active Clustering and Environmental Attitudes

Table 5.6 shows the summary of the relationships between the five environmental dimensions and active and non-active recreationists.

Table 5.6
Environmental Attitudes Dimensions by Active/Non-active Recreationists

	Active	Non-active	F	p<
Negative Consequence of Growth/Technology	2.48	2.70	5.22	0.02
Relationship Between Humans and Nature	1.83	2.07	6.10	0.01
Quality of Life	2.34	2.50	1.81	N/S
Limits to the Biosphere	2.18	2.27	0.47	N/S
Technical Solutions to Environmental Issues	2.89	2.90	0.0	N/S

N/S = Not significant

Two of these relationships were statistically significant which provides some support to the second hypothesis. First, there was a statistically significant difference in the statements of active and non-active recreationists about the negative consequences of growth. The mean score for active recreationists was 2.47 while the mean score for non-active recreationists was 2.70. There was also a statistically significant difference between active and non-active recreationists in the dimension measuring the relationship between humans and nature. The mean score for active recreationists was 1.83 while the mean score for non-active recreationists was 2.07. As well, the patterns that emerged, except for the technical solutions to environmental issues dimension, suggest that active recreationists are more pro-environmental than non-active recreationists.

Appreciative/Mechanized Clustering and Environmental Attitudes

Table 5.7 shows the comparison between the same five environmental dimensions and appreciative and mechanized recreationists.

Table 5.7
Environmental Attitudes Dimensions by Appreciative/Mechanized Recreationists

	Appreciative	Mechanized	F	p<
Negative Consequence of Growth/Technology	2.46	2.55	0.56	N/S
Relationship Between Humans and Nature	1.73	2.09	6.73	0.01
Quality of Life	2.23	2.63	3.49	N/S
Limits to the Biosphere	2.04	2.53	6.50	0.01
Technical Solutions to Environmental Issues	2.84	3.01	0.70	N/S

*N/S = Not significant

Two relationships were statistically significant. Appreciative recreationists scored lower than mechanized recreationists on the statements concerning the relationship between humans and nature dimension, and also in the statements concerning the limits to the biosphere dimension. The differences in the three non-significant dimensions, however, were in the hypothesized direction.

Summary

Using bivariate analyses between the socioeconomic variables of gender, age and income with environmental attitudes the only relationship that proved to have any statistical significant was that between gender and environmental attitude mean scores. This supports part of the first hypothesis of the thesis. With the other two socio-economic variables, although patterns exist that would suggest differences in environmental attitudes that could be attributable to both income and age, these relationships were not statistically significant.

The relationship between the active and non-active recreation styles and the environmental attitudes groupings was significant and in the expected direction. When active and non-active recreation styles were compared using environmental attitude mean scores, the relationship was also significant and in the expected direction. The relationship between appreciate/mechanized recreation styles and the environmental attitudes groupings was not significant. When appreciate/mechanized recreationist styles were compared with environmental attitude mean scores the results were significant and in the

expected direction. These results lend modest support to both the second and third hypotheses.

When active and non-active recreation styles were compared with the five environmental dimensions relationships only two dimensions were statistically significant even though all the relationships showed associations in the expected direction. These results provide weak support for the second hypothesis.

When appreciative and mechanized recreation styles were compared with the five environmental dimensions only two of the relationships were statistically significant even though all the relationships showed associations in the expected direction. These results provide weak support for the third hypothesis.

CHAPTER 6

CONCLUSIONS

This study has attempted to explore aspects of relationships between socio-economic variables, recreation behaviour, and environmental attitudes. Although not all of the hypothesized relationships were found, evidence emerged from the data to support associations between some of these variables. As well, the process of creating this thesis has been important in learning how to conduct this type of research.

This chapter is organized into four sections. The first section will give an overview of both the univariate and bivariate findings. The second section will discuss research design problems, particularly the problems which emerged in data analysis that resulted from the low response rate to the questionnaire. The third section will discuss future research directions suggested by this study. The final section will be a general conclusion to the thesis.

Summary of Results and Implications of the Findings

The univariate analysis findings and their implications

Socio-economic attributes used for analysis were gender, age and income. The manner in which these attributes were reported by respondents to the questionnaire necessitated manipulation of the data to create aggregations for each. Because of the small number of respondents, the resulting number of groupings in each socio-economic variables was quite small. Age was aggregated into only three groups, the smallest of which were those under the age of 30. Income, which was originally reported in 5,000 dollar increments, resulted eventually in three income categories. With this particular

variable, the three groups were not similar in size and the number of those with a household income $30,000 and under was much smaller than the other two categories. The distribution of income, thus, did not reflect what would be considered typical household income in Alberta. This was a result of the sample selection for this study, which contained households from three high income Edmonton neighbourhoods. Gender was simply categorized into male and female respondents.

The environmental attitudes statements in the questionnaire were aggregated first by reporting the total of the scores, and then calculating mean scores for each. Using these statements, respondents were classified into three approximately equal-sized groups for comparison purposes after other methods of classification were attempted. The consistency of these groups in accurately reflecting ecocentric, moderate and technocentric orientation was tested by using F-tests among each environmental attitude group on the 23 environmental attitude statements and on a five-dimension variation of Jackson's (1986) four environmental attitude dimensions. With only one exception, the ecocentrics exhibited the lowest mean scores, technocentrics exhibited highest mean scores, and moderates exhibited mean scores between the other two groups. Thus, the analysis of variance confirmed that three environmental attitude groups existed and were significantly different from each other. As well, the distribution of total scores to the 23 environmental attitude statements was similar to both Jackson (1986) and Coburn (1992).

Cluster analysis initially revealed two styles of recreationists, which were called active and non-active recreationists. Two further subgroups were identified within the active recreationists who had higher than average participation rates in appreciative and

mechanized recreation activities. Cluster analysis for this data was judged to be most appropriate because it aggregates respondents who participate in similar combinations of recreation activities and, thus, reveals recreation styles. These aggregations were then used for bivariate analysis to test the hypotheses of this thesis.

The bivariate findings and their implications

Hypothesis 1

It was hypothesized that there would be statistically significant relationships shown between the socio-economic variables of gender, age, income and environmental attitudes. However, the only relationship that proved to have any statistical significant was that between gender and environmental attitudes. This supports only part of the first hypothesis of the thesis. It does, however, support the findings of previous researchers (McStay & Dunlap, 1983; Gifford et al., 1982) that gender and environmental attitudes are related. Concerning age and income, although patterns exist in the data that would suggest differences in environmental attitudes possibly attributable to these two variables, these relationships were not statistically significant. It is possible that with a larger sample group these relationships would have emerged with statistical significance since one of the problems with this study was its small sample size. Previous researchers have either assumed or have found that these two socio-economic variables have some relationship to environmental attitudes, even though the direction and the magnitude of the associations have not always agreed.

Hypothesis 2

The analysis of the relationship between environmental attitudes and recreational behaviour was not conclusive. The relationships which emerged provide only moderate

support for the hypothesis, since active and non-active recreation styles were found to be related to both environmental attitude mean scores and to the environmental attitude grouping of respondents into ecocentric, moderate and technocentric categories in the hypothesized direction. However, when active and non-active recreation styles were compared to the five environmental attitude dimensions only two of the five dimensions displayed statistical significance.

Hypothesis 3

The relationship between environmental attitudes and appreciative/mechanized recreation styles did not display a strong association. If these variables would have been associated, it would have lent support to the general hypothesis seen in recent research that these types of recreation styles have a relationship to environmental attitudes.

However, the relationships which emerged provided only weak support for the hypothesis. The only significant relationship that emerged with appreciative and mechanized recreation styles was with the mean environmental attitude scores. No association emerged between appreciative/mechanized recreation styles and the three environmental attitude groups of ecocentric, moderate and technocentric respondents. As with active and non-active recreation styles, there were only two dimensions out of the five environmental attitudes dimensions that had positive associations to appreciative and mechanized recreation styles.

Research Design Problems

The most evident problem encountered in this thesis was in analyzing variables with the relatively low response rate for the questionnaire and the consequently small numbers of respondents available for analysis. When the already small number of

respondents were aggregated by different means, the resulting small sizes of the groups were responsible for the lack of statistical significance in much of the bivariate analysis. Although 500 survey packages were distributed, only 165 questionnaires were returned, giving a response rate of just over 33 percent.

Possible Causes of the Low Response Rate

There are three possible causes of the low response rate. First, the appearance of the survey package could have been improved by generally making the package more appealing. Secondly, the timing of the survey package could have been a factor in the low response rate. Finally, the accurate representation of the purpose of the survey may have been misleading to prospective respondents. Each of these points will be discussed briefly in the following subsections.

Questionnaire Package Design

There must be an incentive for a prospective respondent to read and complete any questionnaire. In our society people have many unwanted intrusions into their lives and the appearance of a survey questionnaire may either go unnoticed or may be deliberately ignored. Any research survey must be perceived by prospective respondents as being something substantively different from other requests for time that they receive. Appearance is an important factor in making this differentiation and the appearance of the questionnaire could have been improved in an attempt to increase response rate. With recent advances in personal computers and technology, there are many strategies that could be employed which could increase the quality of survey package design which may, in turn, increase response rates. The inclusion of a graphic element of some sort on the cover page of a questionnaire, for example a digitized photograph, could engage the

interest of a prospective respondent. Using desktop computers, colour scanners, and colour output devices, this is easier to accomplish. However, while the technology exists, the limitation in this regard is the knowledge to manipulate this technology, the time to learn the technology, and the expense involved with such technology to produce a better questionnaire survey.

Timing of the Survey

The survey packages were distributed in June and July, two months when many people, if not taking holidays and thus unavailable, may not otherwise be inclined to complete and return a questionnaire. The timing of the questionnaire for this study, however, had some limitations imposed upon it that were outside of the control of the researcher. Related to the timing of questionnaire distribution is that of the questionnaire reminder. In this study the reminder was only sent to one half of the households to which the original survey package was sent. This was necessary for financial considerations, but had it been possible to have sent out reminders to all the households, the overall number of returned questionnaires would likely have been higher. Ideally, personal contact would increase response rate even more, as evidenced in the response rate of Bikales and Manning (1990), but such contact with 500 possible respondents represents a great increase in the time and cost involved in conducting this type of study.

Representation of the Survey

The most common comment in the returned surveys, and one which occurred frequently, was that the questionnaire misrepresented itself to the respondent by presenting itself as a *Recreation Activities Survey* rather than a survey of both recreation activities and environmental behaviour. It is possible there were people who began

completing the questionnaire and never finished it when they realized that the stated purpose of the questionnaire did not match its actual purpose.

Effects of the low response rate

The low response rate had two main effects on this study. First, the focus of the analysis was placed on only a few people and reduced the quality of the results. Had there been a higher return rate, the relationships that exhibited patterns to support the hypotheses could have had statistical significance. Second, the small sample size limits the ability to extend the results to a population other than that of those in the study sample. Thus, it is impossible to generalize or form theories about the relationships which emerged from this study to any population other than the sample itself. The results of the thesis can only be considered a description of the sample group itself.

Future Research Directions

This section is an overview of ideas for further research that resulted from this study which may extend our knowledge of the relationship between socio-economic variables, recreational behaviour and environmental attitudes.

First, little advance in research techniques has occurred regarding the relationship between socio-economic variables and environmental attitudes, particularly in how environmental attitudes have been measured in this body of research so far. Standardizing environmental attitudes measurement in future socio-economic studies, for example, may yield better results in examining this relationship. For a parallel example, research into environmental attitudes and recreation behaviour did not find a conclusive relationship until a better measure of environmental attitudes emerged. Additional research in this area

using, for example, the NEP scale modified by Jackson, may result in more conclusive results than have previously been obtained. Using a standardized environmental attitudes measure may also help in the replication of results in future research.

Second, the employment of qualitative research techniques, in addition to the quantitative techniques that are normally employed, would have benefit in subsequent research. Using these techniques in conjunction with a quantitative approach may increase understanding of the nature of the relationships and may help reduce the subjectivity of the researcher in assessing the nature of particular recreation activities and attitudes. For example, qualitative research work prior to conducting a quantitative study may inform a researcher more completely about aspects of a particular recreation behaviour that may not be familiar.

Third, the relationship between income and environmental attitudes is perhaps the least examined and most inconclusive of the socio-economic relationships researched. This may be an area to explore in future research since it is possible that income indirectly affects the use of resources in recreation behaviour. For example, higher income people generally have more freedom to purchase recreation equipment and to partake in recreation activities, such as motorboating, that may adversely affect the environmental. To understand how these relatively unconstrained people behave and what their environmental attitudes are may be an important area for future research.

Van Liere and Dunlap (1980) offered two suggestions for future research to improve understanding in the area of environmental concern. First, they suggested future research be directed toward specific environmental issues and policies since they thought

that there was a problem in "lumping such diverse issues as air and water pollution, population control, and wildlife protection together into global measures of environmental concern" (Van Liere & Dunlap, 1980, p. 193). Second, Van Liere and Dunlap suggested examining cognitive variables in examining environmental concern, rather than demographic ones, since they believed that there may be more utility in understanding differences in degree of environmental concern instead. While some research has incorporated these points, more research could be conducted that takes these suggestions into account.

In general, more research into the relationship between socio-economic variables, environmental attitudes and recreation behaviour could be valuable in determining factors that affect environmental attitudes and recreation behaviour. Some researchers suggest that there is no relationship, but it may be possible that the methodologies presently used are simply not able to detect relationships that may very well exist; similar to research that did not find a relationship between environmental attitudes and recreation behaviour until more sophisticated research methods emerged.

Conclusion

Some researchers suggest our society is progressing from a 'consumer' society to a 'conserver' society, where the 'New Environmental Paradigm' defines the prevailing view of the environment. This is most evident in Shetzer et al.'s 1992 study of business students. The authors believed this group, because of their chosen field of study, would not be pro-environmental. They found, however, that these students were, in actuality,

strongly pro-environmental judging by their responses to the NEP. As more instances of environmental deterioration become evident, this progression will likely continue.

While the shift from consumer to conserver society may be taking place, Gifford, Hay and Boros (1983) point out that there is a difference between emotional concern for the environment and the ability to translate that concern into behaviour. They found that emotion toward the environment did not necessarily correspond to actual knowledge. One would also suspect that knowledge may or may not translate into behaviour. So while adherence to the NEP is increasing, it would be interesting to discover to what extent this awareness is really affecting behaviour.

As well, the perceived shift to a conserver society may not be a function of choice as Jackson (1989) suggests, but rather from economic necessity. For example, real income in Alberta has decreased since the early 80's and in a society where user fees are being introduced or increased and unemployment or underemployment is increasing, people may not have the means to pursue, or be prepared to pursue, activities that require a large amount of income for participation. They may be turning, from some element of necessity, to less consumptive activities such as walking, reading, and bicycling that may not have as high associated costs as other activities, such as motorboating or motorized trail riding.

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Appendix A

Cover Letter

University of Alberta
Edmonton

Department of Geography

107

Canada T6G 2H4

3-32 HM Tory Building, Telephone (403) 492-3274
E-mail: geog@geog.ualberta.ca
Fax: (403) 492-7598

July 1, 1992

Dear Edmonton resident;

I am a graduate student in the Department of Geography at the University of Alberta. I am conducting a survey regarding the recreation behaviour and the environmental attitudes of individuals as part of the requirement for my degree.

To this end, I am seeking your help. I have selected a random sample group to whom I have sent surveys concerning recreation behaviour. I am asking that the adult member (someone over 18) in your household whose birthday is closest to the date on which you receive this survey package complete the enclosed survey questionnaire and return it to me using the enclosed business reply envelope. The reason for having different people in a household fill in the survey is to make sure there is some variation in the people who fill in the questionnaire. If this person is unable or unwilling to complete the survey, I would appreciate having ***any*** adult member in the household complete the survey and return it. If you live alone, please fill in the questionnaire yourself.

Filling out the survey will take a minimal amount of time and would help my research enormously. The responses will be anonymous; there are no markings on either the survey nor the return envelope that would allow me to identify who has returned it. If you have any questions I may be reached at 431-1372. Thank you in advance for returning the survey. If you would like a summary of results please return the enclosed reply card under separate cover.

Yours truly,

Larry M. Retzlaff

Appendix B

Questionnaire

RECREATION ACTIVITY SURVEY

GUIDELINES

1. If there is some part of the survey that is not clear, please feel free to call me at 431-1372. I will be able to help you in filling out the survey without having to know who you are. If I do not answer the phone and you do not wish to leave a message, please call again. If you do leave a message, use your first name only.

2. Once you have completed the survey questionnaire, please place it in the enclosed, business reply envelope and return it as soon as you can. There is no cost for postage for you.

PROJECT ADDRESS:

Department of Geography
Room 3-32
Henry Marshall Tory Building
University of Alberta
Edmonton, Alberta

Thank you for participating in this survey.

Recreation Participation

1. Please circle the number which corresponds to how often you normally took part in the following recreational activities in the last year (Please answer only for the season in which the activity is appropriate).

	Daily	1-3 times each wk.	Less than once/wk	Less than once/mo.	Never
ATV/off-road vehicles	1	2	3	4	5
Attending sports events	1	2	3	4	5
Attending educational courses	1	2	3	4	5
Attending live theatre, concerts, etc.	1	2	3	4	5
Bicycling	1	2	3	4	5
Canoeing	1	2	3	4	5
Court games (tennis, racquetball, etc.)	1	2	3	4	5
Cross country skiing	1	2	3	4	5
Dancing (social, folk, ballet, etc.)	1	2	3	4	5
Day hiking	1	2	3	4	5
Downhill skiing	1	2	3	4	5
Driving for pleasure	1	2	3	4	5
Fishing	1	2	3	4	5
Football	1	2	3	4	5
Gardening	1	2	3	4	5
Golf (other than driving range or mini golf)	1	2	3	4	5
Hockey	1	2	3	4	5
Horseback riding	1	2	3	4	5
Hunting	1	2	3	4	5
Ice skating (not hockey)	1	2	3	4	5
Jogging/running	1	2	3	4	5
Martial arts (judo, karate, etc.)	1	2	3	4	5
Motor boating	1	2	3	4	5
Motorized trail riding	1	2	3	4	5
Mountain biking	1	2	3	4	5
Overnight camping	1	2	3	4	5
Playing video and electronic games	1	2	3	4	5
River rafting	1	2	3	4	5
Reading for pleasure	1	2	3	4	5
Sailboarding/windsurfing	1	2	3	4	5
Sailing	1	2	3	4	5

	Daily	1-3 times each wk.	Less than once/wk	Less than once/mo.	Never
Skateboarding	1	2	3	4	5
Snowmobiling	1	2	3	4	5
Softball/baseball	1	2	3	4	5
Swimming (in lakes, rivers)	1	2	3	4	5
Swimming (in pools)	1	2	3	4	5
Tobogganing	1	2	3	4	5
Visiting a museum, art gallery, etc.	1	2	3	4	5
Walking for pleasure	1	2	3	4	5
Watching television	1	2	3	4	5
Waterskiing	1	2	3	4	5
Weightlifting	1	2	3	4	5

Recreational Preferences

2. Please list your 3 favourite leisure or recreational activities and show **how many** times you participated in **each** during the past 12 months by circling the appropriate number.

Activities	**1 to 10 times**	**11 to 30 times**	**31 to 50 times**	**51+ times**
Favourite_____	1	2	3	4
Second favourite_____	1	2	3	4
Third favourite_____	1	2	3	4

3. Is there any leisure or recreational activity that you do not take part in, but would like to start doing regularly? (Please circle one number only.)

1 NO Go to question **6** on page 4.
2 YES Please continue to next question.

4. Please indicate which leisure or recreational activity you would most like to start.

Activity:_____

5. People have many reasons for NOT taking part in a leisure or recreational activity. Based on the activity that you would most like to start, how important are each of the following reasons for not starting this activity? (Please circle ONE number for EACH statement.)

	Very Important		**Somewhat Important**	**Not Important**
Admission fees or charges for facilities or programs.	1	2	3	4
The rental or purchase cost of equipment and supplies.	1	2	3	4
The recreational facilities or areas are overcrowded.	1	2	3	4
The recreational facilities or areas are poorly kept.	1	2	3	4
I don't know where I can take part in this activity	1	2	3	4

	Very Important	Important	Somewhat Important	Not Important
It is difficult to find others to do the activity with.....	1	2	3	4
I don't know where I can learn the activity.....	1	2	3	4
There is no opportunity to do it near my home.....	1	2	3	4
The cost of transportation.....	1	2	3	4
Lack of transportation.....	1	2	3	4
Too busy with my family.....	1	2	3	4
Too busy with my work.....	1	2	3	4
Too busy with other things.....	1	2	3	4
I don't have the physical abilities.....	1	2	3	4
I am not at ease in social situations	1	2	3	4

Other (please specify) _____

6. Please indicate what you do to help conserve energy or protect the environment where you live.

	Always	Often	Sometimes	Seldom	Never
I participate in the Blue Box recycling program.....	1	2	3	4	5
I buy "environmentally-friendly" products	1	2	3	4	5
To reduce pollution I limit how much I drive	1	2	3	4	5
I turn down my thermostat when I am not home.....	1	2	3	4	5
I use energy-efficient appliances or tools.....	1	2	3	4	5

Other (Please specify)_____

7. Do you own any of the following recreational or leisure equipment? (Please check each that you own)

ATV/off road vehicle _____
Nordic skis _____
Downhill skis _____
Video recorder _____
Video camcorder _____
Compact disc player _____
Projection TV _____
Nintendo game _____
Computer system _____
Mountain bike _____
Motor boat _____
Snowmobile _____
Camping equipment _____

Environmental Attitudes

8. Here are some statements dealing with issues relating to environmental attitudes. Please read each statement carefully, then circle the number which corresponds ***most closely*** to your opinion about that statement. There are no right answers; what is important is ***your*** opinion.

	Strongly Agree	Agree	No Opinion	Disagree	Strongly Disagree
Humans need not adapt to the environment since they can remake it to suit their needs.	1	2	3	4	5
To maintain a healthy economy we will have to develop a "steady state" economy where industrial growth is controlled.	1	2	3	4	5
There are limits to growth beyond which our industrialized society cannot expand.	1	2	3	4	5
The balance of nature is very delicate and very easily upset.	1	2	3	4	5
Canadians are going to have to reduce their consumption of material goods over the next few years.	1	2	3	4	5
More emphasis should be placed on teaching children about ecology than about science and technology.	1	2	3	4	5
Plants and animals exist primarily to be used by humans.	1	2	3	4	5
We cannot keep counting on technology to solve society's problems.	1	2	3	4	5
Science and technology often do as much harm as they do good.	1	2	3	4	5
We can continue to raise our standard of living through the application of science and technology	1	2	3	4	5
Humans are severely abusing the environment.	1	2	3	4	5
Rapid economic growth often creates more problems than benefits.	1	2	3	4	5
The positive benefits of economic growth far outweigh any environmental consequences.	1	2	3	4	5
In the long run, there are no limits to the extent to which we can raise our standard of living.	1	2	3	4	5
Economic growth improves the quality of life for all Canadians.	1	2	3	4	5
Humans must live in harmony with nature in order to survive.	1	2	3	4	5
When humans interfere with nature it often produces disastrous consequences.	1	2	3	4	5
The earth is like a spaceship with only limited room and resources.	1	2	3	4	5

	Strongly Agree	Agree	No Opinion	Disagree	Strongly Disagree
Most problems can be solved by applying more and better technology.	1	2	3	4	5
Humans were created to rule over the rest of nature.	1	2	3	4	5
We are approaching the limit of the number of people the earth can support.	1	2	3	4	5
Humans have the right to modify the natural environment to suit their needs.	1	2	3	4	5
In general, the Canadian people would be better off if the nation's economy stopped growing	1	2	3	4	5

Environmental Issues

9. Here are some statements dealing with environmental issues. Please read each statement carefully, then circle the number that corresponds ***most closely*** to your opinion on that statement. There are no right answers, it is ***your*** opinion that is important.

	Strongly Agree	Agree	No Opinion	Disagree	Strongly Disagree
Controls should be placed on industry to protect the environment even if it means that things will cost more.	1	2	3	4	5
Recycling is an important way of decreasing the amount of pollution in our environment.	1	2	3	4	5
There is no problem with overpopulation since human society will solve the problem before it becomes too serious.	1	2	3	4	5
There is too much emphasis being placed on the depletion of the earth's ozone layer.	1	2	3	4	5
Environmental restrictions should be relaxed to encourage the development of natural resources.	1	2	3	4	5
Financial support for research related to the development of solar energy should be encouraged	1	2	3	4	5
I am concerned about the deterioration of the quality of the environment in Alberta.	1	2	3	4	5
Priority should be given to developing some alternatives to fossil fuels as a primary energy source	1	2	3	4	5
Large-scale forestry such as that taking place in Alberta should be halted or drastically reduced.	1	2	3	4	5
We should not have strict standards for pollution that discourage economic growth.	1	2	3	4	5

Personal Information

This section is to help give us some idea about who you are. These questions are for classification purposes only. Please complete this section by circling the number for the appropriate responses for each question.

10. What is your sex?

1 MALE
2 FEMALE

11. In what year were you born? _____

12. What is your highest level of education? (Please circle **all** applicable categories)

1 NOT COMPLETED HIGH SCHOOL
2 COMPLETED HIGH SCHOOL
3 ATTENDED TECHNICAL SCHOOL
4 COMPLETED TECHNICAL SCHOOL
5 ATTENDED UNIVERSITY
6 FINISHED 1 UNIVERSITY DEGREE
7 MORE THAN 1 DEGREE
8 OTHER (please specify) _____

13. What is the approximate income of your household? (Please include **all** sources)

1 UNDER $10 000
2 $10 000-29 999
3 $30 000-49 999
4 $50 000-69 999
5 $70 000-89 999
6 OVER $90 000

14. What is the household structure where you live?

1 1 ADULT, NO CHILDREN
2 1 ADULT, 1 CHILD
3 1 ADULT, MORE THAN 1 CHILD
4 2 ADULTS, NO CHILDREN
5 2 ADULTS, 1 CHILD
6 2 ADULTS, MORE THAN 1 CHILD
7 OTHER (please specify) _____

COMMENTS

Please feel free to include any additional comments or observations that you have on either your responses to this questionnaire or the questionnaire in general.

THANKS FOR YOUR PARTICIPATION IN THE PROJECT.

PLEASE ENCLOSE THIS QUESTIONNAIRE
IN THE ENVELOPE PROVIDED AND DROP IT IN THE MAIL.

IF YOU ARE INTERESTED IN RECEIVING A SUMMARY OF THE RESULTS OF THIS SURVEY, PLEASE FILL IN THE ENCLOSED CARD AND RETURN IT IN A SEPARATE ENVELOPE.